STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
GEORGE D. NORDENHOLT, Director

DIVISION OF MINES
FERRY BUILDING, SAN FRANCISCO

WALTER W. BRADLEY — State Mineralogist

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CALIFORNIA MINERAL PRODUCTION

AND

DIRECTORY OF MINERAL PRODUCERS

FOR 1935

By
HENRY H. SYMONS

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LETTER OF TRANSMITTAL

April, 1937

To His Excellency, THE HONORABLE FRANK F. MERRIAM,
Governor of the State of California.

SIR: I have the honor to herewith transmit Bulletin No. 112 of the Division of Mines, of the Department of Natural Resources, being the annual report of the statistics of the mineral production of California.

The remarkable variety, total valuation, and wide distribution of many of our minerals revealed herein show California's importance as a producer of commercial minerals among the states of the Union.

Respectfully submitted.

GEORGE D. NORDENHOLT,
Director, Department of Natural Resources.

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INTRODUCTION

It is the endeavor of the staff of the State Division of Mines (formerly State Mining Bureau), in these annual reports of the mineral industries of California, to so compile the statistics of production that they will be of actual use to producers and to those interested in the utilization of the mineral products of our State, while at the same time keeping the individual's data confidential. In addition to the mere figures of output, we have included descriptions of the uses and characteristics of many of the materials, as well as a brief mention of their occurrences.

The compilation of accurate and dependable figures is an extremely difficult undertaking, and the State Mineralogist takes the opportunity of here expressing his appreciation of the cooperation of the producers in making this work possible. A fuller appreciation of the value of early responses to the requests sent out in January will result in earlier completion of the manuscript. Statistics lose much of their value if their publication is unnecessarily delayed.

Some of the data relative to properties and uses of many of the minerals herein described are repeated from preceding reports, as it is intended that this annual statistical bulletin shall be somewhat of a compendium of information on California's commercial minerals and their utilization.

WALTER W. BRADLEY,
State Mineralogist.

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MINERAL INDUSTRY, CALIFORNIA, 1935

DATA COMPILED FROM DIRECT RETURNS FROM PRODUCERS IN ANSWER TO INQUIRIES SENT OUT BY THE CALIFORNIA STATE DIVISION OF MINES, FERRY BUILDING, SAN FRANCISCO, CALIFORNIA

CHAPTER ONE

The total value for the mineral output for California for the year 1935 was $263,404,317, being an increase of $26,029,608 over the total of 1934 which was $237,374,709. There were fifty-eight different mineral substances, exclusive of a segregation of the various stones grouped under gems; and all fifty-eight counties of the State contributed to the list.

As revealed by the data following, the salient features of 1935 compared with the previous year, were: The fuels, metals and industrial groups showed a marked increase in total values, while the structural and saline groups registered decreased total values. Petroleum showed the greatest increase in value and output, followed by gold, natural gas, brick and hollow building-tile, lime and limestone, silver, pottery clay, soda, and granite. Those showing decreased values were cement, miscellaneous stone, mineral water, borates and salt.

Of the fuels, petroleum showed an increase in value of $19,805,640 and an increase in amount from 174,721,282 barrels to 205,979,855 barrels of crude oil. The average received for all gravities of crude oil was less than in 1934. Natural gas showed an increase in both amount and value from 263,207,517 M cu. ft., worth $14,408,761 in 1934, to 302,447,193 M cu. ft. worth $17,680,661.

Of the metals, the gold output showed an increase from 719,063.92 fine ounces, to 890,430.00 fine ounces, and an increase in value from $25,131,284 to $31,165,050. The gold value for 1935 was $35 a fine oz. while that in 1934 was calculated on an average weighted value of $34.95. Silver increased from 844,413 fine ounces worth $545,883 in 1934, to 1,191,112 fine ounces worth $856,112; quicksilver from 7,964 flasks valued at $534,135, to 9,353 flasks worth $628,590; copper and lead also showed increased values; while tungsten ore and zinc each showed a decrease in amount and value.

Of the structural materials, cement declined from 8,936,085 bbls. valued at $12,445,616, to 8,086,292 bbls. worth $10,120,721; miscellaneous stone decreased from a value of $7,131,330 to $5,571,041, with marble and sandstone also showing decreased values, while brick and hollow building-tile increased in value from $1,644,661, to $1,855,343; granite from $249,083, to $339,917; and lime from 32,500 tons valued at $309,765, to 59,731 tons worth $573,212; magnesite and slate also showed increased values.

Of the industrial group, increased values were shown by barite, diatomite, pottery clay, gypsum, limestone, pumice and volcanic ash,

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silica, talc and soapstone, while the only important materials in this group to show decreased values were mineral water and sulphur. The total value of this group increased from $4,276,566, to $4,618,588.

Of the salines, increased values were shown by magnesium salts, salt, soda, potash, bromine, and calcium chloride, but not enough to offset the losses in value shown by borates and iodine. The group as a whole showed a decrease in total value from $10,413,019 in 1934 to $9,700,802 in 1935.

The delay in final compilation of the detailed figures for 1935, has been due to late receipt of the data on gold, silver, and petroleum, for which the Division of Mines depends upon other agencies.

By Substances.

The following table shows the comparative yield of mineral substances of California for 1934 and 1935, as compiled from the returns received at the State Division of Mines, San Francisco, in answer to inquiry sent to producers:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Barite	21,769 tons	$125,514	22,979 tons	$133,810	$8,296+
Bentonite (Fuller's Earth)	6,168 tons	69,325	10,204 tons	68,372	953—
Borax	240,696 tons	5,524,262	280,249 tons	4,602,064	922,198—
Brick and hollow building tile		1,644,661		1,855,343	210,682+
Cement	8,936,085 bbls.	12,445,616	8,086,292 bbls.	10,120,721	2,524,895—
Chromite	294 tons	3,498	523 tons	6,111	2,613+
Clay (pottery)	190,510 tons	245,900	240,014 tons	377,969	132,069+
Coal	13,549 tons	52,720	8,049 tons	32,745	19,975—
Copper	590,068 lbs.	47,252	2,031,836 lbs.	168,645	121,393+
Gems		2,456		945	1,511—
Gold	719,084 fine ozs.	25,131,284	890,430 fine ozs.	31,165,050	6,033,766+
Granite		249,083		339,917	90,834+
Gypsum	58,149 tons	113,606	70,833 tons	151,807	38,201+
Iodine	355,279 lbs.	423,016	*	*	* —
Lead	804,911 lbs.	29,782	1,142,405 lbs.	45,695	15,913+
Lime	32,500 tons	309,765	59,731 tons	573,212	263,447+
Limestone	198,057 tons	461,139	227,214 tons	496,054	34,915+
Magnesium salts	2,325 tons	194,642	2,795 tons	235,531	40,889+
Marble[a]		10,759		9,884	875—
Mineral water	19,882,436 gals.	1,071,197	16,659,254 gals.	940,333	130,864—
Natural gas	263,207,517 M cu.ft.	14,408,761	302,447,193 M cu.ft.	17,680,661	3,271,900+
Petroleum	174,721,282 bbls.	159,529,671	205,979,855 bbls.	179,335,311	19,805,640+
Platinum	520 ozs.	14,884	147 ozs.	4,152	10,732—
Pumice and volcanic ash	9,951 tons	54,248	14,890 tons	87,055	32,807+
Quicksilver	7,946 flasks	534,135	9,353 flasks	628,590	94,455+
Salt	332,194 tons	1,222,810	365,711 tons	1,230,480	7,670+
Sandstone		14,245		9,268	4,977—
Silica (sand and quartz)	70,432 tons	296,643	70,835 tons	297,272	629+
Silver	844,413 fine ozs.	545,883	1,191,112 fine ozs.	856,112	310,229+
Slate	5,065 tons	24,245		40,912	16,667+
Soapstone and Talc	13,920 tons	158,606	17,332 tons	170,830	12,224+
Soda	99,380 tons	1,219,561	125,504 tons	1,341,045	121,484+
Stone, miscellaneous[b]		7,131,330		5,571,041	1,560,289—
Sulphur	4,412 tons	67,656	*	*	* —
Tungsten ore	261 tons	224,417	118 tons	194,542	29,875—
Zinc	721,719 lbs.	31,034	328,013 lbs.	14,432	16,602—
Unapportioned		[c]3,741,103		[d]4,618,406	877,303+
Total values		$237,374,709		$263,404,317	
Net increase					$26,029,608

* Included under 'Unapportioned.'

[a] Includes onyx and travertine.

[b] Includes macadam, crushed rock, ballast, rubble, rip rap, sand, gravel.

[c] Includes bituminous rock, asbestos, bromine, calcium chloride, carbon dioxide, diatomite, dolomite, feldspar, fluorspar, iron ore, magnesite, manganese ore, molybdenum ore, potash, pyrite, sillimanite-andalusite-cyanite group, paving blocks, tube-mill pebbles, wollastonite.

[d] Includes bituminous rock, bromine, calcium chloride, carbon dioxide, diatomite, dolomite, feldspar, graphite, iodine, iron ore, magnesite, manganese ore, mica, mineral paint, potash, pyrite, sillimanite-andalusite-cyanite group, sulphur and tube-mill pebbles.

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By Counties.

The following table shows the comparative value of the mineral production of the various counties in the State for the years 1934 and 1935:

County	*1934 Value*	*1935 Value*
Alameda	$2,379,633	$2,010,493
Alpine	25,431	9,441
Amador	2,400,161	2,765,299
Butte	637,962	1,009,952
Calaveras	2,196,592	2,312,953
Colusa	45,875	1,901
Contra Costa	1,734,999	1,361,616
Del Norte	81,998	46,589
El Dorado	1,738,576	2,388,999
Fresno	5,772,807	30,016,686
Glenn	30,608	41,287
Humboldt	81,432	85,065
Imperial	108,480	124,135
Inyo	1,293,725	1,559,806
Kern	37,053,187	46,944,409
Kings	28,067,389	10,580,002
Lake	260,481	320,750
Lassen	28,318	21,732
Los Angeles	66,359,227	72,148,990
Madera	264,142	306,644
Marin	183,354	113,914
Mariposa	807,908	873,242
Mendocino	14,351	10,429
Merced	1,050,492	1,704,775
Modoc	48,117	52,432
Mono	212,438	223,748
Monterey	190,902	132,689
Napa	398,214	198,156
Nevada	7,488,996	9,195,148
Orange	25,746,031	24,360,634
Placer	678,232	1,026,451
Plumas	181,143	414,516
Riverside	2,590,545	2,226,623
Sacramento	3,877,757	4,336,763
San Benito	266,857	242,254
San Bernardino	10,537,050	9,886,453
San Diego	487,266	471,387
San Francisco	28,641	892
San Joaquin	148,097	416,270
San Luis Obispo	138,453	265,443
San Mateo	1,562,490	1,590,159
Santa Barbara	7,570,191	8,680,173
Santa Clara	386,445	312,676
Santa Cruz	1,796,844	1,533,433
Shasta	1,145,180	1,350,262
Sierra	1,046,307	860,716
Siskiyou	648,166	705,737
Solano	23,641	7,450
Sonoma	162,005	170,800
Stanislaus	418,177	585,656
Sutter	3,322	357
Tehama	39,575	11,391
Trinity	650,620	745,186
Tulare	184,474	53,911
Tuolumne	423,588	474,610
Ventura	13,688,749	14,236,946
Yolo	38,027	34,665
Yuba	1,951,046	1,841,221
Total value	$237,375,709	$263,404,317

Total Mineral Production of California, by Years, Since 1887.

The following tabulation gives the total value of mineral production of California by years since 1887, in which year compilation of such data by the State Mining Bureau (now Division of Mines) began. At the side of these figures have been placed the values of the most important metal and nonmetal items—gold and petroleum.

In the same period copper made an important growth beginning with 1897 following the entry of the Shasta County mines, and later Plumas County. Cement increased rapidly from 1902, while crushed

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rock, sand and gravel as a group paralleled the cement increase. Quicksilver has been up and down. Mineral water and salt have always been important items, but the values fluctuate. Borax has increased materially since 1896. War-time increases, 1915–1918, were shown by chromite, copper, lead, magnesite, manganese, silver, tungsten and zinc. Most of these have since declined, though silver, structural materials and copper increased in 1920–1924, also lead and magnesite in 1923; lead and zinc in 1925; zinc in 1926, with silver declining; an increase in quicksilver in 1927–1928, with declines in other metals and by petroleum. Natural gas showed a steady increase from 1907, and in 1928-1933 its value was second only to petroleum.

In 1929 the annual output of gold was the smallest since its discovery. From 1929 to 1935 there was a rapid increase in gold production, due in part to the raise in its price per ounce.

Total Mineral Production of California, by Years, Since 1887

Year	Total value of all minerals	Gold, value	Petroleum, value
1887	$19,785,868	$13,588,614	$1,357,144
1888	19,469,320	12,750,000	1,380,666
1889	16,681,731	11,212,913	368,048
1890	18,039,666	12,309,793	384,200
1891	18,872,413	12,728,869	401,264
1892	18,300,168	12,671,900	561,333
1893	18,811,261	12,422,811	608,092
1894	20,203,294	13,923,281	1,064,521
1895	22,844,663	15,334,317	1,000,235
1896	24,291,398	17,181,562	1,180,793
1897	25,142,441	15,871,401	1,918,269
1898	27,289,079	15,906,478	2,376,420
1899	29,313,460	15,336,031	2,660,793
1900	32,622,945	15,863,355	4,152,028
1901	34,355,981	16,989,044	2,961,102
1902	35,069,105	16,910,320	4,692,189
1903	37,759,040	16,471,264	7,313,271
1904	43,778,348	19,109,600	8,317,809
1905	43,069,227	19,197,043	9,007,820
1906	46,776,085	18,732,452	9,238,020
1907	55,697,949	16,727,928	16,783,943
1908	66,363,198	18,761,559	26,566,181
1909	82,972,209	20,237,870	32,398,187
1910	88,419,079	19,715,440	37,689,542
1911	87,497,879	19,738,908	40,552,088
1912	88,972,385	19,713,478	41,868,344
1913	98,644,639	20,406,958	48,578,014
1914	93,314,773	20,653,496	47,487,109
1915	96,663,369	22,442,296	43,503,837
1916	127,901,610	21,410,741	57,421,334
1917	161,202,962	20,087,504	86,976,209
1918	199,753,837	16,529,162	127,459,221
1919	195,830,002	16,695,955	142,610,563
1920	242,099,667	14,311,043	178,394,937
1921	268,157,472	15,704,822	203,138,225
1922	245,183,826	14,670,346	173,381,265
1923	344,024,678	13,379,013	242,731,309
1924	374,620,789	13,150,175	274,652,874
1925	434,519,660	13,065,330	330,609,829
1926	450,330,856	11,923,481	345,546,677
1927	366,781,394	11,671,018	260,735,498
1928	332,224,233	10,785,315	229,998,680
1929	432,248,228	8,526,703	321,366,863
1930	365,604,695	9,451,162	271,699,046
1931	215,964,420	10,814,162	141,835,723
1932	199,196,493	11,765,726	142,890,247
1933	206,489,058	15,683,075	143,063,972
1934	237,374,709	25,131,284	159,529,671
1935	263,404,317	31,165,050	179,335,311
Totals	$6,974,533,879	$788,729,048	$4,409,749,616

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CHAPTER TWO

FUELS

Among the most important mineral products of California are its fuels. This subdivision includes coal, natural gas, and petroleum, the combined values which make up practically 75 per cent of the State's entire mineral output for the year 1935.

There are deposits of peat known in several localities in California, small amounts of which are used as a fertilizer, and in stock-food preparations, but none has yet been recorded as utilized for fuel.

Comparison of values during 1934 and 1935 is shown in the following table:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Coal	13,548 tons	$52,720	8,049 tons	$32,745	$20,075—
Natural gas	263,207,517 M cu.ft.	14,408,761	302,447,193 M cu.ft.	17,680,661	3,271,900+
Petroleum	174,721,282 bbls.	159,529,671	205,979,855 bbls.	179,335,311	19,805,640+
Total values		$173,991,152		$197,048,717	
Net increase					$23,057,565+

COAL

Bibliography: State Mineralogist Reports VII, XII-XV (inc.), XVII, XIX-XXVIII (inc.), XXVI, XXXI. U. S. Geol. Surv., Bulletins 285, 316, 431, 471, 581; Ann. Rept. 22, Pc. III.

The coal production in California during 1935 totaled 8,049 short tons valued at $32,745, as compared with the 1934 output, which was 13,549 tons worth $52,720. The material mined in 1935 came from a single property each, in Amador, Monterey, and Trinity counties. This coal was consumed by the local market and also used on the property for camp purposes, power and forge, to carry on regular operations and development work.

Total Coal Production of California.

The very considerable output of coal in the years previous to 1883 was almost entirely from the Mount Diablo district, Contra Costa County. Later the Tesla mine in Corral Hollow, Alameda County, was an important producer for a few years. Stone Canyon, Monterey County, was also an important producer for a short time, and there has been some coal shipped from properties in Amador, Fresno, Orange, Riverside, Siskiyou and Trinity counties. The following tabulation gives the annual tonnages and values, according to available records:

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Coal Output and Value, by Years

Year	Tons	Value	Year	Tons	Value
1861	6,620	$38,065	1899	160,941	$420,109
1862	23,400	134,550	1900	176,956	535,531
1863	43,200	248,400	1901	150,724	401,772
1864	50,700	291,525	1902	88,460	248,622
1865	60,530	348,048	1903	93,026	265,383
1866	84,020	483,115	1904	79,062	376,494
1867	124,690	716,968	1905	46,500	144,500
1868	143,676	826,137	1906	24,850	61,600
1869	157,234	904,096	1907	23,734	55,849
1870	141,890	815,868	1908	18,496	55,503
1871	152,493	876,835	1909	49,389	216,913
1872	190,859	1,097,439	1910	11,033	23,484
1873	186,611	1,073,013	1911	11,047	18,297
1874	215,352	1,238,274	1912	14,484	39,092
1875	166,638	958,169	1913	25,198	85,809
1876	128,049	736,282	1914	11,859	28,806
1877	107,789	619,787	1915	10,299	26,662
1878	134,237	771,863	1916	4,037	7,030
1879	147,879	850,304	1917	3,527	7,691
1880	236,950	1,362,463	1918	6,343	16,149
1881	140,000	805,000	1919	2,983	8,203
1882	112,592	647,404	1920	2,078	5,450
1883	76,162	380,810	1921	12,467	63,578
1884	77,485	309,950	1922	27,020	135,100
1885	71,615	286,460	1923	1,010	5,090
1886	100,000	300,000	1924	1,425	8,800
1887	50,000	150,000	1925	730	3,880
1888	95,000	380,000	1926	1,100	5,000
1889	121,280	288,232	1927	200	1,100
1890	110,711	283,019	1928	782	4,542
1891	93,301	204,902	1929	450	2,476
1892	85,178	209,711	1930	10,885	59,858
1893	72,603	167,555	1931	12,551	77,607
1894	59,887	139,862	1932	9,508	36,468
1895	79,858	193,790	1933	2,612	11,367
1896	70,649	161,335	1934	13,549	52,720
1897	87,449	196,255	1935	8,049	32,745
1898	143,045	337,475			
			Totals	5,266,996	$23,382,241

The tonnages in the above table for the years 1861–1886 (incl.) are taken from the U. S. Geological Survey, "Mineral Resources of the U. S., 1910," p. 107. The values assigned for the years previous to 1883 are those given by W. A. Goodyear (Mineral Res., 1882, pp. 93–94), being an average of $5.75 per ton. From 1887 to date the figures are those of the California State Mining Bureau.

NATURAL GAS

Bibliography: State Mineralogist Reports VII, X, XII, XIII, XIV, XXIX. Bulletins 3, 16, 19, 69, 73, 89. Monthly Summary Oil and Gas Supervisor, Dec., 1919; Aug., 1922; Mar., 1923; Mar. and Apr., 1926.

Statistics on the production of natural gas in California are in a considerable degree difficult to arrive at, as much of it that is utilized directly at the wells for heating, lighting, and driving gas engines is not measured. Hence, it is necessary to approximate the output of many of the operators in the oil fields, estimated on the number of lights, and on the number and horsepower of gas engines and steam boilers thus operated. The figures here given are for gas utilized locally and also that sold for distribution to consumers; and we consider are not overestimated, particularly in the six oil-producing counties. It must be remembered that some of our important oil fields are removed many miles from the site of any other industry, and that the gathering of

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small amounts of gas and transporting it for any considerable distance may not always be profitable, nor is it often possible to have pipe-line facilities available to handle the gas accompanying the early gas production in newly developed fields. Wherever feasible, casing-head gas is used in driving gas engines for pumping and drilling, and in firing the boilers of steam driven plants.

Actual Production of Natural Gas—How Disposed of In California—1935

County	*Production M cu. ft.*	*Utilized M cu. ft.*	*Wasted M cu. ft.*	*Stored M cu. ft.*
Fresno	65,499,962	63,579,904	1,861,343	58,715
Kern	46,514,140	36,089,134	8,965,897	1,459,109
Kings	67,040,315	65,372,401	1,599,592	68,322
Los Angeles	70,548,881	66,416,318	2,837,319	1,295,244
Orange	28,415,526	25,810,647	2,565,175	39,704
Santa Barbara	5,302,505	4,596,531	546,662	159,312
Ventura	41,089,879	39,278,994	998,731	812,154
Other counties	1,319,184	1,303,264	15,920	--------
Totals	325,730,392	302,447,193	19,390,639	3,892,560

Production and Value.

There is a rather wide variation in prices quoted for natural gas because a considerable part is used directly in the field for driving gas engines and firing boilers, and is therefore not measured nor sold. Such companies as have placed a valuation on the gas that was thus used in 1935 gave from 2¢ to 75¢ per 1000 cu. ft. at the well. From the totals shown in the tabulation following herein, the average value for all fields in 1935 works out at approximately 5.85¢ per M cu. ft. Approximately 7000 cu. ft. of gas is equal to one barrel of oil in heating value, and is so accounted for by many operators. In driving gas engines, about 4000 cu. ft. per 24 hr. are consumed by a 25-h.p. engine, and 63,700 cu. ft. per day for heating a 70-h.p. steam boiler, which figures have been utilized in compiling this report, in those cases where gas was not metered.

Utilized Production of Natural Gas in California, 1935

County	*M cu. ft.*	*Value*
Fresno	63,579,904	$3,687,049
Kern	36,089,134	1,891,675
Kings	65,372,401	3,088,477
Los Angeles	66,416,318	4,448,950
Orange	25,810,647	1,802,397
Santa Barbara	4,596,531	524,998
Ventura	39,278,994	2,036,287
Butte, Humboldt, Lake, Mendocino, Monterey, Sacramento, San Joaquin, Santa Clara, Tulare *	1,303,264	200,828
Totals	302,447,193	$17,680,661

* Combined to conceal the output of individual operators in each.

The above totals show increases in amount and value over those of 1934 which were 263,207,517 M cu. ft. valued at $14,408,761. Los Angeles County lead in the yield of natural gas during 1935, followed by Kings County. Increased values of output were shown by Fresno, Kern, Los Angeles, Orange, Santa Barbara, and Ventura counties; and San Joaquin is now producing over a million M cu. ft. Decreased production was reported by Kings County.

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Natural Gas Production in California Since 1888.

The production of natural gas in California by years since 1888 is given in the following table. The first economic use of natural gas in California was from the famous courthouse well at Stockton, bored in 1854–1858. Beginning about 1883 and for several succeeding years, a number of gas wells were brought in around Stockton, and later at Sacramento. Natural gas was known in a number of other localities, and occasionally utilized in a small way, notably at Kelseyville in Lake County, and in Humboldt County near Petrolia and Eureka, but there are no available authentic records of amounts or values previous to the year 1888. The most important developments in the commercial production of natural gas have been coincident with developments in the oil fields, by utilizing the casing-head gas as well as that from dry-gas wells.

Natural Gas Production in California Since 1888

Year	M cubic feet	Value	Year	M cubic feet	Value
1888	[a]12,000	$10,000	1913	14,210,836	$1,053,292
1889	[a]14,500	12,680	1914	16,529,963	1,049,470
1890	[a]41,250	33,000	1915	21,992,892	1,706,480
1891	[a]39,000	30,000	1916	28,134,365	2,871,751
1892	[a]75,000	55,000	1917	44,343,020	2,964,922
1893	[a]84,000	68,500	1918	46,373,052	3,289,524
1894	[a][b]85,000	75,000	1919	52,173,503	4,041,217
1895	[a][b]110,000	100,000	1920	58,567,772	3,898,286
1896	[a][b]131,000	110,157	1921	67,043,797	4,704,678
1897	[a]71,300	62,657	1922	103,628,027	6,990,030
1898	[a]111,165	74,424	1923	240,405,397	15,661,433
1899	115,110	95,000	1924	209,021,596	15,153,140
1900	40,566	34,578	1925	194,719,924	15,890 082
1901	120,800	92,034	1926	214,549,477	19,465,347
1902	120,968	99,443	1927	224,686,940	20,447,294
1903	120,134	75,237	1928	260,887,116	22,260,947
1904	144,437	91,035	1929	400,129,201	29,675,546
1905	148,345	102,479	1930	315,513,952	24,559,840
1906	168,175	109,489	1931	344,959,920	16,690,695
1907	169,991	114,759	1932	284,168,872	16,272,061
1908	842,883	474,584	1933	271,743,544	15,403,514
1909	1,148,467	616,932	1934	263,207,517	14,408,761
1910	10,579,933	1,676,367	1935	302,447,193	17,680,661
1911	[a]5,000,000	491,859			
1912	[a]12,600,000	940,076	Totals	4,012,431,900	$281,784,281

[a] Quantity, in part, estimated, where values only were reported.
[b] Tabulations published previously to 1933 included values of CO_2, now shown under "Industrial Materials."

Gasoline from Natural Gas.

More or less gas usually accompanies the petroleum in the oil fields, and such gas carries varying amounts of gasoline. A total of 91 plants were in operation in 1935 recovering gasoline by compression or absorption from this 'casing-head' gas. After the gasoline is extracted the remaining 'dry gas' so far as practicable is taken into pipe lines, by which it is distributed to consumers, both domestic and commercial.

A total of 540,927,628 gallons of casing-head gasoline valued at $26,352,213 was reported made from all fields in California by 91 plants during 1935 compared with 505,929,436 gallons worth $31,089,877 from 95 plants in 1934. The 1935 output was distributed as follows:

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County	No. plants	Gallons	Value
Fresno	1	26,651	$2,822
Kern	6	50,096,444	2,426,984
Kings	18	154,221,269	8,012,161
Los Angeles	37	209,841,611	9,590,118
Orange	15	66,729,467	3,360,889
Santa Barbara	5	10,387,201	508,400
Ventura	9	49,624,985	2,450,839
Totals	91	540,929,628	$26,352,213

The usual recoveries of gasoline from natural gas vary from ½ gal. to 3 gal. per 1000 cu. ft. of gas handled, the average being about 1 gal. per 1000 cu. ft. The U. S. Bureau of Mines Report by Knudsen[1] gives the average recovery for 1935 as 1.572 gallons per 1000 cu. ft. of gas treated. His figures show the following production by methods:

	M cu. ft. natural gas treated	Gallons of gasoline recovered	Recovery gallons per M cu. ft.
Oil absorption	336,763,011	529,637,006	1.544

PETROLEUM

Bibliography: State Mineralogist Reports IV, VII, X, XII, XIII, XXIX, XXXI. Bulletins 3, 11, 16, 19, 31, 32, 63, 69, 73, 82, 84, 89. Reports of Oil and Gas Supervisor 1915 to date (issued in monthly chapters since April, 1919, to June, 1929, and quarterly from then on). U. S. Geol. Surv. Bulletins 213, 285, 309, 317, 321, 322, 340, 357, 398, 406, 431, 471, 541, 581, 603, 621, 623, 653, 691. Prof. Papers 116, 117. "American Petroleum; Supply and Demand"; Amer. Petr. Inst., 1925.

The crude petroleum produced in California during 1935 amounted to a total of 205,979,855 barrels having a value of $179,335,311 at the well. This was an increase in both amount and value as compared with the 1934 output, which was 174,721,282 barrels worth $159,529,671.

This total of quantity is compiled from the monthly production reports filed by the operators with the State Oil and Gas Supervisor.

The question of the value of the crude oil yield at the well is a difficult one to settle with exactitude principally because a large part of the output is not sold until after refining. The large refiners are also large producers of crude oil which they send direct from well to plant, hence much of the crude oil is not sold as such.

The value used in the statistical reports of the State Mining Bureau and the Division of Mines from 1914 to 1927 (inc.) was derived from an average of actual sales of crude oil of all grades in each field of the State and their average applied to the total yield of each respective field. The 1929–1933 values, used by the Division of Mines, were obtained by using the production of crude oil by gravities produced in each field[2] and applying an average of current price quotations for crude oil at the well as compiled by California Oil and Gas Association.

The value given to the 1934–1935 petroleum output by this department was obtained by using the average gravity oil for each field, to which was applied the average quotation for the year of said grade oil.

[1] Knudsen, E. T., The Petroleum Situation in the Pacific Coast Territory (Monthly for 1935), U. S. Bureau of Mines.

[2] By courtesy of Standard Oil Co. of California.

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TABLE A

Production and Value of Crude Oil by Counties

County	1934		1935	
	Barrels	Value	Barrels	Value
Fresno	6,607,661	$4,295,980	27,679,545	$26,047,611
Kern	41,823,494	30,475,225	54,723,481	39,905,553
Kings	21,393,483	23,104,962	7,167,687	7,490,233
Los Angeles	60,297,000	59,711,578	70,378,196	64,339,261
Orange	25,891,732	24,258,123	24,971,601	22,422,526
Santa Barbara	6,648,120	6,322,148	7,649,068	7,068,739
Ventura	12,007,550	11,331,335	13,333,298	12,016,509
Colusa, San Bernardino, San Luis Obispo, San Mateo, Santa Clara, Tulare*	52,242	30,320	------	------
San Luis Obispo, Santa Clara, and Tulare*	------	------	76,979	44,879
Totals	174,721,282	$159,529,671	205,979,855	$179,335,311

* Combined to conceal the output of operators in each.

The foregoing totals show the average price of $0.870 per barrel for the year 1935, as compared with $0.913 in the year 1934, $0.831 in 1933, $0.807 in 1932, $0.753 in 1931, and $1.195 in 1930.

TABLE B

Average Price of Oil per Barrel, by Counties, 1926-1935

County	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935
Fresno	$0.815	$0.830	$0.764	$0.519	$0.568	$0.551	$0.556	$0.573	$0.650	$0.941
Kern	1.445	1.139	.835	.741	.838	.636	.658	.665	.729	.729
Kings				1.674	1.515	.723	.837	.934	1.085	1.045
Los Angeles	1.645	1.115	1.051	1.189	1.297	.784	.860	.892	.990	.914
Orange	1.559	1.207	.935	.986	1.060	.753	.762	.827	.937	.898
San Luis Obispo							.550			
Santa Barbara	.793	.750	1.108	1.255	1.404	.954	.962	.848	.951	.924
Santa Clara							.550			
Ventura	1.512	1.177	1.098	1.150	1.396	.771	.849	.838	.944	.901
State averages	$1.538	$1.127	$0.992	$1.094	$1.195	$0.753	$0.807	$0.831	$0.913	$0.870

For several years previous to 1919, the State average value per barrel at the well for crude oil as determined by the statistical returns was noted to practically coincide with the quotations during the same years for 23° gravity oil in the San Joaquin Valley fields. In 1919 and since, the average values have worked out at figures corresponding to quotations up to, in one year as high as 28° oil, due to the large yield of high-gravity oils from the new fields in the Los Angeles-Orange counties area.

TOTAL PETROLEUM PRODUCTION OF CALIFORNIA

The presence of oil seepages and springs in Los Angeles and Ventura counties was known and utilized in a small way early in the history of California. Some also was shipped to refineries at San Francisco from Santa Barbara and Humboldt counties. In the light of present-day developments, the following reference to the previous year's production of oil and its future prospects as expressed by the San Francisco Bulletin of January 8, 1866, is strikingly prophetic even though skeptical:

"It is possible that the small quantity received (40,000 or 50,000 gallons in 1865) may be the forerunner of many millions which will, at some future time, lubricate the wheels of commerce and set a trade at work excelling in variety any that has

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thus far been known on this coast. At present, however, we admit to being a little skeptical about the assumption of the astute Professor Silliman that California will be found to have more oil in its soil than all the whales in the Pacific Ocean."

According to Hanks,[1] in 1874 production amounted to 36 bbl. per day from natural flows in Pico Cañon (Newhall), and at Sulphur Mountain (Ventura County), the oil being of 32° gravity average.

"Work was commenced in Pico Canyon in 1875 by drilling three shallow wells with spring pole, all of which yielded oil at depths of from 90 to 250 feet. Actual work of development commenced with steam machinery in 1877."[2]

In 1877 Pico averaged 40-50 bbl. daily, and Ventura 80 bbl. daily. In 1878, there was some production (at 60 bbl. per day, for a time) from wells in Moody Gulch, near Los Gatos, Santa Clara County, the oil being of 46° Baumé.

The first wells in the Coalinga, Fresno County, and Summerland, Santa Barbara County, fields were drilled in 1890, but Coalinga did not make its influence felt conspicuously on the state's annual output until 1903. The Summerland yield never has been large. The Salt Lake field near Los Angeles began production in 1894 and in 1897 reached over a million barrels annually.

In the Kern County fields, the first well was drilled in Sunset in 1891, Midway in 1900, McKittrick in 1892, Kern River in 1899. The Sunset-Midway district attained a yield of over 4,000,000 bbl. in 1909, and over 20,000,000 bbl. in 1910. Kern River field produced over 3,000,000 bbl. in 1901.

The first well in the Santa Maria-Lompoc group, Santa Barbara County, was drilled in 1901, and the district advanced to a yield of over 3,000,000 bbl. annually in 1905.

The Whittier-Fullerton field in Los Angeles and Orange counties became an important factor in 1902. The Montebello field, Los Angeles County, was the conspicuous addition in 1918-1919; and Elk Hills, Kern County, with Huntington Beach and Richfield, Orange County, in 1920. In 1921, the new fields added were Long Beach and Santa Fe Springs, Los Angeles County; in 1922, Torrance field in Los Angeles County, and Wheeler Ridge field in Kern County; but the production from the large number of new wells started in these new Los Angeles County fields did not reach its peak until August and September, 1923. Dominguez (Compton) came in during 1923; followed by Rosecrans and Inglewood in 1924. Ventura recorded important additions to its producing area in 1925 and 1926. Seal Beach, Orange County, and Mt. Poso, Kern County, were the new fields added in 1926; Round Mountain, Kern County, and Rincon, Ventura County, were the new fields added in 1927; with Potrero in Los Angeles County, Elwood in Santa Barbara County and Kettleman Hills in Kings County in 1928.

During 1929 Playa del Rey was added to the oil fields in Los Angeles County.

The effect of the advent of these various fields to the producing column will be noted in the tabulation herewith, by years:

[1] Hanks, Henry G., Report IV of State Mineralogist, p. 298, 1884.
[2] *Idem*, p. 301.

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TABLE C

Total Petroleum Production in California

Year	Barrels	Value	Year	Barrels	Value
To and inc. 1875	[a] 175,000	[b] $472,500	1906	32,624,000	$9,238,020
1876	12,000	30,000	1907	40 311,171	16,783,943
1877	13,000	29,250	1908	48,306,910	26,566,181
1878	15,227	30,454	1909	58,191,723	32,398,187
1879	19,858	39,716	1910	77,697,568	37,689,542
1880	40,552	60,828	1911	84,648,157	40,552,088
1881	99,862	124,828	1912	89,689,250	41,868,344
1882	128,636	257,272	1913	98,494,532	48,578,014
1883	142,857	285,714	1914	102,881,907	47,487,109
1884	262,000	655,000	1915	91,146,620	43,503,837
1885	325,000	750,750	1916	90,262,557	57,421,334
1886	[a] 377,145	[b] 870,205	1917	95,396,309	86,976,209
1887	678,572	1,357,144	1918	99,731,177	127,459,221
1888	690,333	1,380,666	1919	101,182,962	142,610,563
1889	303,220	368,048	1920	103,377,361	178,394,937
1890	307,360	384,200	1921	112,599,860	203,138,225
1891	323,600	401,264	1922	138,468,222	173,381,265
1892	385,049	561,333	1923	262,875,690	242,731,309
1893	470,179	608,092	1924	228,933,471	274,652,874
1894	783,078	1,064,521	1925	232,492,147	330,609,829
1895	1,245,339	1,000,235	1926	224,673,281	345,546,677
1896	1,257,780	1,180,793	1927	231,195,774	260,735,498
1897	1,911,569	1,918,269	1928	231,811,465	229,998,680
1898	2,249,088	2,376,420	1929	292,534,221	321,366,863
1899	2,677,875	2,660,793	1930	227,328,988	271,699,046
1900	4,319,950	4,152,928	1931	188,310,605	141,835,723
1901	7,710,315	2,961,102	1932	177,745,286	142,890,247
1902	14,356,910	4,692,189	1933	172,139,362	143,063,972
1903	24,340,839	7,313,271	1934	174,721,282	159,529,671
1904	29,736,003	8,317,809	1935	205,979,855	179,335,311
1905	34,275,701	9,007,820			
			Totals	4,445,385,610	$4,413,356,133

[a] U. S. G. S., Min. Res. of U. S., 1886, p. 440, for quantities to and including 1886.
[b] Values have been estimated for the years to and including 1886, after consulting a number of contemporaneous publications, including the Mining & Scientific Press, Reports of the State Mineralogist, and U. S. Reports. The figures for 1887 to date are from records of the State Mining Bureau.

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Well Data.

The following table is compiled from monthly statements issued by the American Petroleum Institute:

TABLE D

Wells Operated, by Fields, 1935

Field	Wells producing Dec., 1934	Wells producing Dec., 1935	Wells completed during year	Daily initial output	Wells abandoned during year	Bbls. per well produced per day Dec., 1934	Bbls. per well produced per day Dec., 1935
Group No. 1—Belridge—North	23	31	10	26,853	----------	229.4	239.8
Belridge—South	140	169	----------	----------	----------	21.6	14.8
Coalinga	952	982	9	437	28	18.8	20.3
Edison	14	57	48	11,469	19	106.1	47.1
Elk Hills	168	167	----------	----------	5	47.8	52.8
Fruitvale	67	82	17	4,473	2	52.6	61.7
Kern River	1,385	1,536	44	11,043	11	7.5	13.6
Kettleman M. D.	2	2	----------	----------	----------	252.5	52.5
Kettleman N. D.	75	122	35	147,566	4	786.3	433.2
Lost Hills	315	327	1	112	5	14.4	14.8
McKittrick	184	199	4	609	6	17.1	19.2
Midway-Sunset	2,478	2,546	42	10,550	57	20.7	21.8
Mountain View	50	114	69	156,368	10	223.5	221.8
Mt. Poso	152	225	63	36,820	16	74.8	67.5
Round Mountain	49	72	16	14,715	3	95.1	88.6
Wheeler Ridge	34	34	1	75	1	12.0	12.3
Group No. 2—Capitan	13	15	8	1,808	2	56.2	95.3
Elwood	51	64	11	16,396	2	189.4	195.2
Rincon	30	29	1	420	2	36.6	63.3
San Miguelito	4	5	1	1,577	----------	156.5	162.4
Santa Barbara	52	67	21	12,345	14	81.2	48.8
Santa Maria	187	211	4	717	11	25.4	19.9
Summerland	17	19	----------	----------	4	2.4	2.1
Ventura Avenue	178	232	18	7,789	3	131.2	129.7
Ventura-Newhall	464	552	7	1,105	21	8.9	7.3
Watsonville	7	7	----------	----------	----------	8.6	8.6
koup No. 3—Brea-Olinda	352	375	2	147	2	29.8	26.4
Coyote—East	76	84	2	160	----------	33.8	32.2
Coyote—West	25	61	8	7,854	1	352.4	159.6
Dominguez	71	100	32	25,896	1	357.8	216.9
Huntington Beach	469	510	18	9,649	13	86.8	81.3
Inglewood	206	220	23	22,574	8	46.9	55.8
Lawndale	6	7	1	250	1	21.1	25.1
Long Beach	1,091	1,269	124	33,088	84	57.1	57.3
Los Angeles-Salt Lake	126	128	----------	----------	6	6.4	6.3
Montebello	160	183	10	5,207	4	38.6	34.2
Newport	----------	----------	----------	----------	3	----------	----------
Playa del Rey	160	208	42	82,278	9	53.5	75.0
Potrero	12	11	----------	----------	2	36.9	33.6
Richfield	249	249	----------	----------	6	32.9	30.8
Rosecrans	70	76	1	184	7	41.2	35.8
Santa Fe Springs	492	631	29	7,346	24	78.6	70.2
Seal Beach	110	107	4	2,789	7	79.1	96.6
Torrance	474	506	3	311	14	14.7	64.0
Whittier	159	161	----------	----------	----------	7.0	6.5
Group No. 4—Buttonwillow Gas Field	----------	24	3	(Gas)	----------	----------	----------
Delano Gas Field	----------	----------	5	(Gas)	3	----------	----------
Dudley Ridge Gas Field	----------	----------	----------	----------	5	----------	----------
Goleta Gas Field	----------	----------	2	(Gas)	----------	----------	----------
Semi-Tropic Gas Field	----------	----------	22	(Gas)	12	----------	----------
Tracy Gas Field	----------	2	2	(Gas)	1	----------	----------
Miscellaneous drilling	----------	----------	----------	----------	----------	----------	----------
Totals	11,399	12,136	763	660,980	550	42.3	46.9

Specific Gravity of Oils Produced.

The proportion of heavy and light oil produced in the various fields is shown in Table E, following, for which we are indebted to the Standard Oil Company. Specific gravities in California range from 8°

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Baumé in the Casmalia field, Santa Barbara County, to 60° in Kettleman Hills, Kings County.

California crude oils are all essentially of asphalt base, with a few notable exceptions. In the following localities are wells yielding crudes containing both asphalt and paraffine constituents: Oil City field, Coalinga; a few deep wells in East Side field, Coalinga, a considerable part of the Ventura County field; Western Minerals area, south of Maricopa; Wheeler Ridge, Kern County.

TABLE E

Production of Light and Heavy Oils, by Fields, for 1935

Field	*Under 20° (barrels)*	*20° and above (barrels)*	*Total (barrels)*
San Joaquin Valley			
Belridge—North	1,875	2,714,920	2,716,795
Belridge—South	476,304	438,626	914,930
Coalinga	2,857,602	4,402,149	7,259,751
Comanche Point	400	--------	400
Edison	504,323	426,422	930,745
Elk Hills	753,353	2,460,540	3,213,893
Fruitvale	109,343	1,686,735	1,796,078
Kern River	4,788,019	--------	4,788,019
Kettleman Hills (Middle Dome)	--------	38,497	38,497
Kettleman Hills (North Dome)	--------	27,568,541	27,568,541
Lost Hills	841,790	923,222	1,765,012
McKittrick	1,374,989	5,972	1,380,961
Midway-Sunset	7,972,275	12,261,946	20,234,221
Mountain View	--------	9,175,526	9,175,526
Mount Poso	5,383,633	--------	5,383,633
Round Mountain	1,911,012	421,394	2,332,406
Wheeler Ridge	--------	151,899	151,899
Coastal			
Arroyo Grande	54,432	--------	54,432
Capitan	136,399	385,301	521,700
Elwood	--------	4,559,969	4,559,969
Lompoc	30,371	55,694	86,065
Newhall	12,565	74,069	86,634
Rincon	--------	666,476	666,476
Santa Barbara	1,011,540	70,941	1,082,481
Santa Maria	205,030	1,168,520	1,373,550
San Miguelito	--------	296,283	296,283
Summerland	14,199	--------	14,199
Ventura Avenue	--------	10,969,231	10,969,231
Balance of Ventura County Fields	44,307	1,335,411	1,379,718
Watsonville	22,500	--------	22,500
Southern California			
Coyote—East	66,604	906,642	973,246
Coyote—West	--------	3,553,922	3,553,922
Del Rey	3,877	5,620,049	5,623,926
Dominguez	--------	7,911,300	7,911,300
Huntington Beach	594,859	14,514,886	15,109,745
Inglewood	753,231	3,722,192	4,475,423
Lawndale	--------	42,343	42,343
Long Beach	363,856	26,272,436	26,636,292
Los Angeles	100,408	--------	100,408
Motebello	188,765	2,093,160	2,281,925
Olinda Brea	256,670	3,351,973	3,608,643
Potrero	--------	132,565	132,565
Richfield	427,736	2,359,257	2,786,993
Rosecrans	--------	989,302	989,302
Salt Lake	190,986	--------	190,986
Santa Fe	54,590	16,072,818	16,127,408
Seal Beach	--------	3,374,079	3,374,079
Torrance	1,535,950	942,692	2,478,642
Whittier	261,378	114,022	375,400
Miscellaneous	10,689	21,001	31,690
Totals	33,315,860	174,252,923	207,568,783

Oil in "Storage."

Field, refinery, pipe-line and tank farm stocks of crude and refined products in the Pacific Coast[1] territory totaled 130,628,646 barrels December 31, 1935, as compared with 126,218,317 barrels on December

[1] Standard Oil Bulletin, February, 1936, p. 15.

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31, 1934. The total decrease in stock for the year was 25,540,930 barrels.

	Dec. 31, 1934 (barrels)	*Dec. 31, 1935 (barrels)*
1. Non-gasoline-bearing crude, Residuum, Gas and Diesel oils	67,182,258	68,201,291
2. Gasoline-bearing crude	37,549,934	38,950,469
3. Unblended natural gasoline	2,446,840	1,568,182
4. Gasoline (not including distributing and service stations)	10,343,477	10,760,001
5. Naphtha distillates	*928,053	*1,695,564
6. All other stocks	†7,767,755	†9,453,139
7. Totals all stock	126,218,317	130,628,646
* Estimated amount of unfinished gasoline contained in item No. 5	753,082	1,133,084
† Coke included in item No. 6	568,915	456,766

Utilization of California's Crude Oil.

Most of the crude oil produced in California is sent to storage reservoirs at tank farms near the oilfields and from these reservoirs by pipelines to the refineries, the larger ones of which are located in the vicinity of Los Angeles and on San Francisco Bay.

During 1935 the crude oil consumed in California, according to the U. S. Bureau of Mines[1] was 177,848,265 barrels sent to stills at the refineries; 1,211,143 barrels went to intercoastal shipments; 14,288,218 barrels to foreign shipments; and 19,915,306 barrels were either consumed as fuel or added to residuum and nongasoline-bearing crude.

The production of petroleum products during 1935 is shown in Table F:

TABLE F

Commodity	*Amount in barrels*
Crude petroleum	177,848,265
Natural gasoline including liquid petroleum gas	11,230,988
Gasoline	68,934,038
Kerosene	5,245,606
Lubricating oils and greases	1,843,608
Gas oil and Diesel oil	24,522,430
Residuum nongasoline-bearing crude (a)	75,390,009
Asphalt and road oils	4,926,647
Coke, in tons	530,804
Naphtha distillates	1,331,659
Other unfinished oils	1,515,495
Shortage and still gas production	5,319,963
Total petroleum (net) (b)	189,079,253

(a) Includes 19,915,306 bbls. of heavy crude oil.
(b) Total of crude oil and natural gas gasoline.

Operating Data.

The following tabulation (Table G) is compiled from data published by the State Division of Oil and Gas,[2] semiannually, and here combined to show the entire year's operations for all fields. The districts are the geographical subdivisions as administered by that Division, and which are outlined on the accompanying map.

It will be noted that the State average yield of oil per-well-per-day was 48.3 barrels for the first six months of 1935, and 55.3 barrels for the second. This is somewhat higher than the figure 46.9 barrels average for December derived from American Petroleum Institute data as shown in Table D, on a previous page, due in part at least, to the fact that the latter is on a full-time basis, whereas the Division's figures allow for shut-down time.

[1] Knudsen, E. T., The petroleum situation in the Pacific Coast territory (monthly) 1935, U. S. Bureau of Mines.
[2] Summary of Operations—California Oil Fields; Division of Oil and Gas, Fifteenth Annual Report of State Oil and Gas Supervisor, Vol. 21, No. 1, July, Aug., Sept., 1935, and No. 3, Jan., Feb., March, 1936.

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TABLE G. Production Statistics and Operating Data of California Oil Fields—1935

Field	January 1 to June 30						July 1 to December 31					
	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percentage of time wells produced	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percentage of time wells produced
				Oil	Water					Oil	Water	
DIST. 1—Beverly Hills	11	51,153	1,719	29.8	23.9	86.3	12	53,683	1,836	29.2	24.3	83.2
Brea-Olinda	329	1,832,909	53,866	34.0	14.0	90.5	342	1,803,801	57,927	31.1	14.3	92.1
Coyote Hills	117	2,205,650	17,343	127.2	42.5	81.9	138	2,305,885	21,548	107.0	51.6	84.9
Dominguez	86	3,666,032	13,284	276.0	46.6	85.3	94	4,247,626	15,754	269.6	36.9	91.1
Huntington Beach	486	7,180,260	74,312	96.6	57.4	84.5	499	7,857,381	81,112	96.9	55.8	88.3
Inglewood	202	1,910,010	27,727	68.9	57.2	75.8	213	2,568,082	29,144	88.1	52.7	74.4
Lawndale	6	23,263	1,047	22.2	46.6	96.4	6	20,808	1,079	19.3	45.1	97.7
Long Beach	1,151	11,841,662	178,728	66.3	80.6	85.8	1,237	13,680,373	209,855	65.2	76.4	92.2
Los Angeles City	82	32,300	14,486	2.2	1.5	97.6	82	34,602	14,483	2.4	1.9	96.0
Montebello	172	1,052,479	27,142	38.8	112.7	87.2	181	1,218,335	28,615	42.6	110.6	85.9
Newhall	77	44,395	12,943	3.4	3.8	92.9	80	46,199	13,789	3.4	5.0	93.7
Playa del Rey	178	2,340,132	27,877	83.9	74.8	86.5	209	3,052,567	35,274	86.5	76.9	91.7
Potrero	12	74,113	1,834	40.4	54.6	84.4	10	60,553	1,740	34.8	48.7	94.6
Richfield	247	1,402,339	38,992	36.0	14.7	87.2	249	1,383,376	41,670	33.2	15.0	91.0
Rosecrans	74	501,983	12,157	41.3	52.2	90.8	76	482,346	12,931	37.3	59.7	92.5
Salt Lake	8	45,499	1,379	33.0	151.6	95.2	8	45,452	1,411	32.2	151.9	95.9
Santa Fe Springs	502	6,836,352	77,598	88.1	80.8	85.4	593	9,187,038	100,228	91.7	81.1	91.9
Seal Beach	105	1,686,112	15,287	110.3	207.1	80.4	104	1,686,465	15,680	107.6	179.2	81.9
Torrance	483	1,217,329	81,023	15.0	4.9	92.7	493	1,255,504	84,274	14.9	5.3	92.9
Whittier	162	182,094	26,270	6.9	15.9	89.6	158	194,252	27,144	7.2	17.0	93.4
Los Angeles County	1	6,542	170	38.5	0	93.9	3	32,861	431	76.2	15.5	78.1
Totals	4,491	44,132,608	705,184	62.6	55.9	86.8	4,787	51,217,189	795,925	64.3	55.6	90.4
DIST. 2—Bardsdale	110	83,398	15,793	5.3	1.3	79.3	115	101,760	13,682	7.4	2.0	64.7
Conejo	31	930	5,611	0.2	0.7	100.0	21	500	3,700	0.1	0.7	95.8
Ojai	61	28,140	10,497	2.7	3.9	95.1	62	29,052	10,478	2.8	5.7	91.8
Piru	84	91,656	13,595	6.7	7.5	89.4	85	149,341	13,906	10.7	6.2	88.9
Rincon	34	403,738	4,451	90.7	36.2	72.3	38	561,256	5,936	94.6	22.4	84.9
Santa Paula	45	19,881	5,985	3.3	4.2	73.5	45	19,333	6,149	3.1	4.1	74.3
Sespe	22	58,294	3,412	17.1	1.1	85.7	20	54,506	3,26	16.7	2.0	88.6
Simi	54	22,585	9,657	2.3	0.7	98.8	51	20,737	9,104	2.3	0.7	97.0
South Mountain	78	361,511	10,886	33.2	1.0	77.1	78	344,167	10,215	33.7	1.1	71.2
Ventura	194	4,427,324	27,712	159.8	26.3	78.9	228	6,555,189	35,700	183.6	37.0	85.1
Totals	713	5,497,457	107,599	51.1	10.3	83.4	743	7,835,841	112,132	69.9	15.0	82.0

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Dist. 3—Arroyo Grande	14	18,072	2,414	7.5	4.0	95.3	15	47,376	2,366	20.0	2.0	85.7
Capitan	15	189,109	1,501	126.0	6.0	55.3	14	332,445	1,931	172.2	4.8	75.0
Casmalia	8	21,752	1,108	19.6	42.9	76.5	11	39,905	1,162	34.3	31.1	57.4
Cat Canyon	6	60,676	923	65.7	27.7	85.0	8	81,454	1,403	58.1	31.1	95.3
Elwood	45	1,925,090	6,296	305.8	132.7	77.3	60	2,634,816	9,304	283.2	117.2	84.3
La Goleta Gas	[6]	0	0	0	0	0	[3]	0	0	0	0	0
Lompoc	4	31,542	285	110.7	74.5	39.4	6	56,972	752	75.8	53.5	68.1
Mesa	60	654,447	7,679	85.2	75.1	70.7	63	457,886	10,257	44.6	91.1	88.5
Santa Maria	140	615,305	19,828	31.0	35.7	78.2	143	532,475	20,528	25.9	37.5	78.0
Sargent	8	4,105	1,190	3.4	0	82.2	9	4,718	1,354	3.5	0	81.8
Summerland	7	8,153	1,113	7.3	23.1	87.8	7	6,303	1,155	5.5	19.0	89.7
Santa Barbara County	[1]	738	23	32.1	5.7	12.7	0	0	0	0	0	0
Totals	308	3,528,989	42,360	83.3	53.3	76.0	336	4,194,350	50,212	83.5	58.8	81.2
Dist. 4—Belridge	200	1,532,372	33,975	45.1	11.1	93.9	237	2,069,521	39,901	51.9	10.1	91.5
Buttonwillow Gas	[21]	0	0	0	0	0	[28]	0	0	0	0	0
Devils Den	5	8,044	711	11.3	3.6	78.6	2	5,510	138	39.9	15.7	37.5
Edsion	25	242,851	2,194	110.7	17.5	48.5	46	696,030	6,277	110.9	10.4	74.2
Elk Hills	181	1,447,696	25,718	56.3	102.0	78.5	183	1,765,265	30,349	58.2	93.0	90.1
Elk Hills	0	0	0	0	0	0	[10]	0	0	0	0	0
Fruitvale	72	719,568	9,576	75.1	8.1	73.5	81	1,138,065	12,913	88.1	7.0	86.6
Kern River	1,521	1,988,788	249,281	8.0	22.2	90.5	1,554	2,473,419	264,094	9.4	26.1	92.4
Lost Hills	340	855,190	53,837	15.9	31.1	87.5	341	877,218	58,312	15.0	34.5	92.9
McKittrick Temblor	212	624,547	34,267	18.2	107.7	89.3	233	758,301	40,189	18.9	109.4	93.7
Midway-Sunset	2,568	9,591,853	394,671	24.3	28.9	84.9	2,631	10,680,189	428,775	24.9	28.2	88.6
Midway-Sunset	[7]	0	0	0	0	0	[3]	0	0	0	0	0
Mt. Poso	168	2,274,128	22,802	99.7	84.2	75.0	202	3,101,329	30,502	101.7	76.5	82.1
Mountain View	68	2,578,041	9,509	271.1	7.1	77.3	99	6,564,236	15,057	436.0	9.0	82.7
Mountain View	0	0	0	0	0	0	[1]	0	0	0	0	0
Poso Creek	6	53,697	654	82.1	17.0	60.2	16	203,453	2,063	98.6	17.8	70.1
Round Mountain	59	931,248	7,918	117.6	193.4	74.1	72	1,388,608	10,743	129.3	168.0	81.1
Semitropic Gas	0	0	0	0	0	0	[1]	0	0	0	0	0
Wheeler Ridge	34	76,821	6,039	12.7	3.1	98.1	34	74,992	6,095	12.3	3.0	97.4
Kern County	[1]	478	25	19.1	1.9	13.8	[2]	2,023	82	24.7	2.2	22.3
Kern County	[6]	0	0	0	0	0	[4]	0	0	0	0	0
Tulare County	1	751	119	6.3	6.5	65.7	3	1,957	357	5.5	243.1	64.7
Tulare County	0	0	0	0	0	0	[10]	0	0	0	0	0
Totals	5,461	22,926,073	851,296	26.9	34.0	86.1	5,736	31,800,116	945,847	33.6	35.1	89.6

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TABLE G. Production Statistics and Operating Data of California Oil Fields—1935—Continued

Field	January 1 to June 30						July 1 to December 31					
	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percentage of time wells produced	Average number of producing wells—actual	Oil (bbls.)	Number of days producing	Production per well per day (bbls.)		Percentage of time wells produced
				Oil	Water					Oil	Water	
Dist. 5—Coalinga	991	3,455,871	156,920	22.0	14.8	87.5	986	3,792,274	166,516	22.8	14.0	91.8
Kettleman Middle Dome	1	31,736	144	220.4	108.9	79.6	1	6,779	30	226.0	137.3	16.3
Kettleman North Dome	102	11,106,135	12,525	886.7	83.9	67.8	111	16,454,437	15,907	1,034.4	95.1	77.9
Kings County: Dudley Ridge	[1]	0	0	0	0	0	[1]	0	0	0	0	0
Madera County: Chowchilla Area	0	0	0	0	0	0	[1]	0	0	0	0	0
San Joaquin County: Tracy Area	0	0	0	0	0	0	[1]	0	0	0	0	0
Totals	1,094	14,593,742	169,589	86.1	20.0	85.6	1,098	20,253,490	182,453	111.0	21.1	90.3
Grand totals	12,067	90,678,869	1,876,028	48.3	40.1	85.9	12,700	115,300,986	2,086,569	55.3	41.2	89.3

[1] Gas wells omitted from totals.
[2] Wells produced for 23 days in January and were then closed in.
[3] Two wells producing a total of 25 days.
[4] Two wells producing a total of 82 days.

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CHAPTER THREE

METALS

Bibliography: Reports of State Mineralogist I-XXXII (inc.). Bulletins 5, 6, 18, 23, 27, 36, 50, 57, 76, 78, 85, 92, 95, 108. Spurr and Wormser, "Marketing of Metals and Minerals." See also under each metal.

The total value of metals produced in California during 1935 was $33,198,767. Chief among these is and always has been gold; followed by silver, quicksilver, tungsten ore, iron ore, copper, zinc, lead, platinum.

A comparison of the 1934 output with that of the 1935 output is afforded by the following table:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Chromite	294 tons	$3,498	523 tons	$6,111	$2,613
Copper	590,638 lbs.	47,252	2,031,836 lbs.	168,645	121,393
Gold	719,084 fine ozs.	25,131,284	890,430 fine ozs.	31,165,050	6,033,766
Lead	804,911 lbs.	29,782	1,142,405 lbs.	45,695	15,913
Platinum metals	520 ozs.	14,884	147 ozs.	4,152	10,732—
Quicksilver	7,946 flasks	534,135	9,353 flasks	628,590	94,455
Silver	844,413 fine ozs.	545,883	1,191,112 fine ozs.	856,112	310,229
Tungsten	261 tons	224,417	118 tons	194,542	29,875—
Zinc	721,719 lbs.	31,034	328,013 lbs.	14,432	16,602—
Unapportioned		[a]53,974		[b]115,438	61,464
Total values		$26,616,143		$33,198,767	
Net increase					$6,582,624

[a] Includes iron ore, manganese ore and molybdenum ore.
[b] Includes iron and manganese ores.

ALUMINUM

Bibliography: Report XVIII, p. 198. Bulletins 38, 67. U. S. Geol. Surv., Min. Res. of U. S.

To date there has been no commercial production of aluminum ore in California. Only a single authenticated occurrence of bauxite has thus far been noted in this state, being in Riverside County southeast of Corona, but as yet undeveloped.

ANTIMONY

Bibliography: State Mineralogist Reports VIII, X, XII-XV (inc.), XVII, XXII, XXIII, XXV-XXVII (inc.), XXXI. Bulletins 38, 91.

During 1935 there were no shipments of antimony ore in California. The principal commercial production of antimony in California has come from Kern, Inyo and San Benito counties, and other occurrences have been noted in Nevada, Riverside, San Bernardino and Santa Clara counties. The commonest occurrence is in the form of the sulphide, stibnite; but in the Kernville and Havilah districts in Kern

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County there were notable deposits of the native metal, being among the few localities of the world where native antimony has been found.

Present New York quotations (Aug. 8, 1935) are around 12¼¢ per pound for Chinese (duty paid) and American spot antimony.

Antimony Production in California, by Years.

The production of antimony ore in California by years since 1887 has been as follows:

Year	Tons	Value	Year	Tons	Value
1887	75	$15,500	1902		
1888	100	20,000	1915	510	$35,666
1889			1916	1,015	64,793
1893	50	2,250	1917	158	18,786
1894	150	6,000	1918		
1895	33	1,485	1925	*26	770
1896	17	2,320	1926		
1897	20	3,500	1927	20	590
1898	40	1,200	1928	20	761
1899	75	13,500	1929		
1900	70	5,700			
1901	50	8,350	Totals	2,429	$201,171

* Annual details concealed under 'Unapportioned.'

ARSENIC

Bibliography: Reports XVIII, XXIII, XXV, XXX. Bulletin 67. U. S. G. S., Min. Res. of U. S.

Arsenic is found in a number of localities in California in the mineral arsenopyrite (FeAsS), which is frequently gold bearing; and in scorodite ($FeAso_4+2H_2O$), an oxidation product of arsenopyrite. The occurrence of realgar (AsS) has also been noted.

Except for a small output in 1924, there has been no commercial recovery of arsenic from California ores. There having been only a single operator, the figures are concealed under the 'Unapportioned' item.

BERYLLIUM

Bibliography: State Mineralogist Report XXVII. Eng. & Min. Jour.-Press, Vol. 118, No. 8, p. 285, Aug. 23, 1924. U. S. Bureau of Mines Information Circular 6190.

Beryllium is a metal resembling aluminum closely in its chemical character. It has a specific gravity of 1.85, is almost as hard as quartz (will scratch glass) and will take a high polish. The use of beryllium as a metal is still more or less in the experimental stage because the cost of extracting the metal from its ores almost makes it prohibitive and the present sources of supply of the ore are limited. Not until such a time when deposits can be found that will assure a definite supply and metallurgical costs are such as to justify its use, will the metal be found in common use.

There are a number of beryllium minerals, but none have been found in commercial quantities, except beryl, which is a beryllium-aluminum silicate. The chief use at present for ground beryl is as an addition to porcelain products, where it reduces the coefficient of expansion. Beryllium metal is difficult to separate from aluminum.

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Present (Feb. 25, 1937) quotations for beryllium ore are per ton in carload lots, minimum 10 per cent BeO $30; minimum 12 per cent BeO, $35, f.o.b. mine.

Beryl occurs in California in the pegmatite dikes of the tourmaline gem district in northern San Diego and northwestern Riverside counties; and an occurrence has recently been noted in western Inyo County, but the quantity is as yet unproved. Thus far there have been no commercial shipments of beryl from California except for gem purposes (the pink and aquamarine varieties).

BISMUTH

Bibliography: Bulletins 38, 67, 91. Am. Jour. Sci., 1903, Vol. 16.

Several bismuth minerals have been found in California, notably native bismuth and bismite (the ochre) in the tourmaline gem district in San Diego and Riverside counties near Pala. Other occurrences of bismuth minerals, including the sulphide, bismuthinite, have been noted in Inyo, Fresno, Nevada, Tuolumne, San Bernardino, and Mono counties, but only in small quantities. The only commercial production recorded was 20 tons valued at $2,400 in 1904, and credited to Riverside County.

The present quotation (Feb. 25, 1937) for bismuth is $1.00 per pound, in ton lots for the refined metal.

CADMIUM

Bibliography: U. S. Geol. Surv., Min. Res. of U. S., 1908, 1918.

During 1917 and 1918, cadmium metal was recovered by the electrolytic zinc plant of the Mammoth Copper Company in Shasta County. It was shipped in the form of 'sticks' and amounted to a total of several thousand pounds for the two years, the exact figures being concealed under 'Unapportioned.' That was the first, and thus far the only, commercial production of cadmium recorded from Californian ore. Cadmium occurs there associated with zinc sulphide, sphalerite. Cadmium also occurs in the Cerro Gordo Mines, Inyo County, associated with smithsonite (zinc carbonate).

The present quotation (Feb. 25, 1937) for cadmium is 75¢ to $1.00 per pound for the refined metal.

CHROMITE

Bibliography: State Mineralogist Reports IV, XII, XIII, XIV, XV, XVII, XVIII, XXI-XXIX (inc.), XXXI, XXXII. Bulletins 38, 76, 91. Preliminary Report 3. U. S. G. S., Bull. 430. Min. & Sci. Press, Vol. 114, p. 552.

During the year 1935 there were shipments of chromite or chromic iron ore in California amounting to 488 short tons, recalculated to a basis of 45% Cr_2O_3, valued at $6,111 f.o.b. shipping point, and came from Fresno, Napa, Placer, San Luis Obispo, and Shasta counties. This was all material that had beeen mined in past years but not sold until 1935. The 1935 shipments showed an increase in both amount and value over those of 1934 which were 294 tons worth $3,498.

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Occurrence.

Chromite is widely distributed in California, the principal production, thus far, having come from El Dorado, San Luis Obispo, Del Norte, Shasta, Siskiyou, Placer, Fresno, and Tuolumne counties. In 1918 a total of 29 counties contributed to the State's output. There are two main belts in California yielding this mineral, one along the Coast Ranges from San Luis Obispo County to the Oregon line, including the Klamath Mountains at the north end, and the other in the Sierra Nevada from Tulare County to Plumas County. Chromite occurs as lenses in basic igneus rocks such as peridotite and pyroxenite, and in serpentines which have been derived by alteration of such basic rocks.

Imports.

Imports during 1935 to the United States, of foreign chromite[1] duty free, mainly from Rhodesia, New Caledonia and India, totaled 253,946 long tons valued at $3,538,380 for the year 1935, compared with 190,797 tons worth $2,250,787.

Total Chromite Production of California.

Production of chromite in California began, apparently, about 1874, principally in San Luis Obispo County. There was considerable activity from 1880 to 1883, inclusive, and a total of 23,238 long tons (or 26,028 short tons), valued at $329,924, was shipped from that county up to the beginning of 1887. Some ore also was shipped from the Tyson properties in Del Norte County. The tabulation herewith shows the output of chromite in California, annually, including the earliest figures so far as they are available. The figures from 1887 to date are from the records of the State Mining Bureau:

Year	Tons	Value	Year	Tons	Value
1874–1876 (San Luis Obispo County)	26,028	$329,924	1911	935	$14,197
1887	3,000	40,000	1912	1,270	11,260
1888	1,500	20,000	1913	1,180	12,700
1889	2,000	30,000	1914	1,517	9,434
1890	3,599	53,985	1915	3,725	38,044
1891	1,372	20,580	1916	48,943	717,244
1892	1,500	22,500	1917	52,379	1,130,298
1893	3,319	49,785	1918	73,955	3,649,497
1894	3,680	39,980	1919	*4,314	97,164
1895	1,740	16,795	1920	1,770	43,031
1896	786	7,775	1921	347	6,870
1897			1922	379	6,334
1898			1923	84	1,658
1899			1924	350	6,700
1900	140	1,400	1925	191	3,712
1901	130	1,950	1926	393	7,063
1902	315	4,725	1927	225	5,063
1903	150	2,250	1928	729	15,179
1904	123	1,845	1929	327	5,025
1905	40	600	1930	84	1,905
1906	317	2,859	1931	441	6,737
1907	302	6,040	1932 [a]	1,206	16,587
1908	350	6,195	1933		
1909	436	5,309	1934	294	3,498
1910	749	9,707	1935	488	6,111
			Totals	247,104	$6,490,065

* Recalculated to 45% Cr_2O_3, beginning with 1919.
[a] Annual details concealed under 'Unapportioned.'

[1] Monthly Summary of Foreign Commerce of U. S. Bureau of Foreign and Domestic Commerce, Dec., 1935.

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COBALT

Bibliography: Report XIV. Bulletins 67, 91. U. S. G. S., Min. Res. of U. S., 1912, 1918. U. S. B. M., I. C. 6331.

Occurrences of some of the cobalt minerals have been noted in several localities in California, but to date no commercial production has resulted. Some of the copper ores of the foothill copper belt in Mariposa and Madera counties have been found to contain cobalt up to 3%.

The nominal quotation for cobalt is around 97 to 99% at $2.50 per pound for the refined metal—30% for cash.

COPPER

Bibliography: State Mineralogist Reports VIII-XXXII (inc.). Bulletins 23, 50, 91.

The output of copper in California during 1935 amounted to a total of 2,031,836 pounds recoverable metal valued at $168,645. This was an increased amount and value over the 1934 production which was 590,638 pounds worth $47,252. The average price of copper in 1935 was 8.3¢ per pound compared with 8.0¢ in 1934; 6.4¢ in 1933; 6.3¢ in 1932; 9.1¢ in 1931; and 13.0¢ in 1930.

Copper was second to gold among the metals in California from 1896 to 1932, when it was passed in output by quicksilver and silver, and in 1933 also by tungsten.

Distribution of the 1935 output of copper in California by counties was as follows:

County	*Pounds*	*Value*
Alameda	27,104	$2,250
Amador	9,641	800
Butte	2,001	166
El Dorado	12,391	1,028
Inyo	42,589	3,535
Kern	37,971	3,152
Los Angeles	3,885	322
Mariposa	2,252	187
Mono	1,295	107
Nevada	201,890	16,757
Placer	3,178	263
Plumas	1,654,113	137,291
Riverside	2,073	172
San Bernardino	19,553	1,623
Shasta	6,178	513
Sierra	1,612	134
Alpine, Calaveras, Contra Costa, Fresno, Modoc, Napa, Orange, Sacramento, San Diego, Siskiyou, Trinity, Tuolumne, Ventura, and Yuba *	4,110	345
Totals	2,031,836	$168,645

* Combined to conceal the output of individual producers in each.

According to preliminary data issued by the U. S. Bureau of Mines[1] the smelter production of primary copper from domestic sources during 1935 amounted to 762,587,340 pounds, an increase of approximately 56 per cent compared with 1934 output. The value increased approximately 62 per cent in 1935. The average price of copper delivered during the year, as reported to the U. S. Bureau of Mines by selling agents, was 8.3¢ per pound.

[1] U. S. Bureau of Mines, Mineral Year Book 1936, p. 112.

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Copper Production of California, by Years.

Although some mining of copper ores in a small way had been done earlier, shipments in appreciable quantities began in 1861 and continued of importance up to the end of 1867, when a total of 68,631 tons (of 2376 pounds) of high-grade ores, and 847 tons of matte or 'regulus'[1] had been shipped to smelters at New York, Boston, and Swansea, Wales. The most important district at that time was Copperopolis and vicinity in Calaveras County, with some shipments also made from Mariposa, El Dorado, Fresno and San Luis Obispo counties. From 1868 to 1882, the output was insignificant. There are wide discrepancies in the figures current recorded for copper production previous to 1882, in which year the data of the U. S. Geological Survey began. The detailed statistics of the California State Mining Bureau began in the year 1894.

Amount and value of copper production in California annually since 1882 is given in the following tabulation:

Copper Production of California, by Years

Year	Pounds	Value	Year	Pounds	Value
1882	826,695	$144,672	1910	53,721,032	$6,680,641
1883	1,600,862	265,743	1911	36,838,024	4,604,753
1884	876,166	120,911	1912	34,169,997	5,638,049
1885	469,028	49,248	1913	34,471,118	5,343,023
1886	430,210	43,021	1914	30,491,535	4,055,375
1887	1,600,000	192,000	1915	40,968,966	7,169,567
1888	1,570,021	235,303	1916	55,809,019	13,729,017
1889	151,505	18,180	1917	48,534,611	13,249,948
1890	23,347	3,502	1918	47,793,046	11,805,883
1891	3,397,405	424,675	1919	22,162,605	4,122,246
1892	2,980,944	342,808	1920	12,947,299	2,382,303
1893	239,682	21,571	1921	12,088,053	1,559,358
1894	738,594	72,486	1922	22,883,987	3,090,582
1895	225,650	21,901	1923	28,346,860	4,166,989
1896	1,992,844	199,519	1924	52,089,349	6,823,704
1897	13,638,626	1,540,666	1925	46,968,499	6,669,527
1898	21,543,229	2,475,168	1926	33,521,544	4,693,014
1899	23,915,486	3,990,534	1927	27,350,316	3,582,888
1900	29,515,512	4,748,242	1928	25,162,304	3,623,360
1901	34,931,788	5,501,782	1929	33,809,258	5,941,799
1902	27,860,162	3,239,975	1930	26,534,752	3,449,522
1903	19,113,861	2,520,997	1931	12,954,842	1,178,890
1904	29,974,154	3,969,995	1932	1,417,536	89,307
1905	16,997,489	2,650,605	1933	992,515	63,521
1906	28,726,448	5,522,712	1934	590,638	47,252
1907	32,602,945	6,341,387	1935	2,031,836	168,645
1908	40,868,772	5,350,777			
1909	65,727,736	8,478,142	Totals	1,147,188,702	$182,415,685

GOLD

Bibliography: State Mineralogist Reports I to XXXII (inc.), (except III and VIII). Bulletins 36, 45, 57, 91, 92, 95, 108. U. S. Geol. Surv., Prof. Paper 73. U. S. Bur. of Mines, Econ. Paper 3 (1929).

Gold was first, and, for many years, the most important single mineral product of California. Although now surpassed for a number of years in annual value by petroleum, and by natural gas from 1923 to 1932, it still heads our metal list, and California continues to outrank all the other gold-producing States of the United States, includ-

[1] Brown, J. Ross, Mineral Resources West of the Rocky Mountains, p. 168, 1867.

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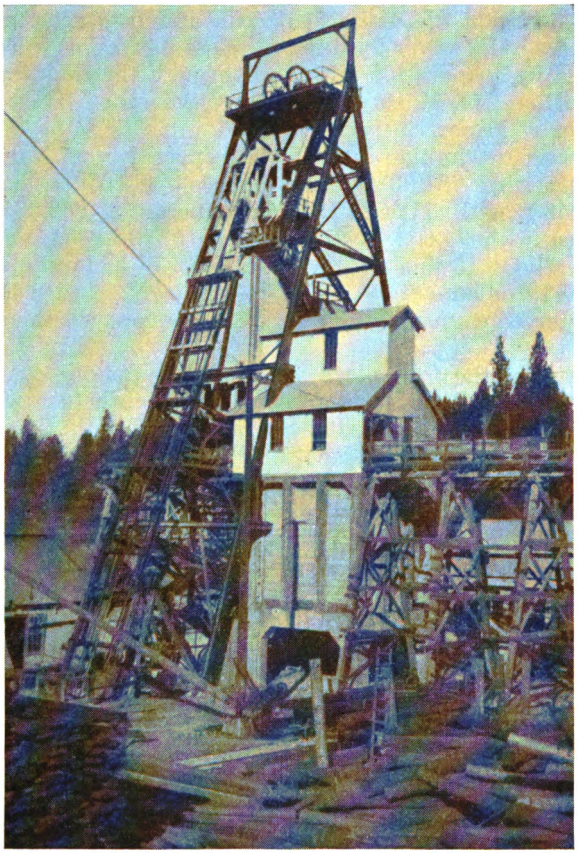
ing Alaska. In fact, at present, California is producing approximately 28% of the gold mined in the entire United States.

There has been a steady increase in the development of both lode and placer mines in California during the last four or five years, brought about by the present economic conditions. During 1934 there were 2599 operators in California, not including snipers, prospectors and various individuals, selling gold in small lots to the bullion dealers. There was no premium paid on gold during 1932, the price being $20.67



New steel headframe of Idaho-Maryland Mine, Grass Valley, Nevada County.

Photo by Walter W. Bradley.

a fine ounce. On August 29, 1933, there was an executive order lifting the embargo on gold ores, concentrates, precipitates, and unretorted amalgam, followed on October 25, 1933, by another order instructing the Reconstruction Finance Corporation to buy newly-mined gold at a price fixed by the U. S. Treasurer which corresponded to the world price, all of which had an effect on the 1933 gold yield. On January 30, 1934, the Gold Reserve Act of 1934 was passed, followed by the President's proclamation of January 31, 1934, which fixed the weight

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of the gold dollar at 15 5/21 grains, nine-tenths fine. The value of gold thereby became $35 a fine ounce. The average weighted value of gold per fine ounce in 1934 was $34.95.

The production of gold in California during 1935 totaled 890,430.00 fine ounces valued at $31,165,050, being an increase of 17,366.08 fine ounces over the 1934 yield. Deep or lode mines accounted for 544,904 fine ounces worth $19,071,640, and placers (mainly bucket-line, dragline and power-shovel dredges) produced 345,536.00 fine ounces worth $12,093,410.

As the Division of Mines has never independently gathered the statistics of gold and silver production, these figures, as in former years, are published by cooperation with and through the courtesy of Charles White Merrill and H. M. Gaylord of the Division of Mineral Statistics, U. S. Bureau of Mines.

The largest production in 1935 was reported from Nevada County, with an output of 251,002.84 fine ounces ($8,785,099); Sacramento County second with 113,823.13 fine ounces ($3,983,985); Amador County third with 74,692.42 fine ounces ($2,614,235); Yuba County fourth with 51,610.13 fine ounces ($1,806,355); Eldorado County fifth with 51,524.81 fine ounces ($1,803,368); followed in turn by Calaveras, Kern, and Merced counties with a combined output worth over a million dollars.

Nevada held the first place as a gold producing county with an output exceeding that of Yuba or Amador which held first and second places respectively in 1928 with Sacramento fourth that year. Sacramento held second place since 1931, its output exceeding that of Amador, which held second place in 1930. The gold from Yuba and Sacramento comes almost entirely from dredges, while that from Nevada and Amador counties comes mainly from the lode mines.

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Distribution of the 1935 gold output by counties was as follows:

County	NUMBER OF OPERATORS[a] Lode	Placer	Value
Alameda	1	--	
Alpine	1	--	$280
Amador	52	35	2,614,235
Butte	29	76	952,632
Calaveras	58	55	1,607,242
Colusa	1	--	938
Del Norte	1	9	4,798
El Dorado	63	227	1,803,368
Fresno	10	10	20,645
Glenn	--	--	2
Humboldt	--	31	31,677
Imperial	12	4	59,406
Inyo	78	9	656,339
Kern	143	38	1,391,646
Kings	--	--	83
Lake	--	--	65
Lassen	4	--	12,182
Los Angeles	13	19	219,405
Madera	19	21	21,410
Mariposa	93	43	514,544
Merced	--	4	1,302,369
Modoc	1	--	84
Mono	23	7	39,994
Monterey	2	2	297
Napa	1	--	3,984
Nevada	39	109	8,785,099
Orange	1	--	1,154
Placer	39	115	925,309
Plumas	26	77	207,856
Riverside	39	12	112,057
Sacramento	2	16	3,983,985
San Bernardino	113	36	279,020
San Diego	11	1	10,367
San Joaquin	--	2	99,698
San Luis Obispo	--	--	287
Santa Cruz	2	--	617
Shasta	40	44	962,448
Sierra	20	83	841,218
Siskiyou	54	151	575,676
Sonoma	--	--	317
Stanislaus	--	8	293,129
Sutter	--	--	357
Tehama	--	--	177
Trinity	29	106	727,787
Tulare	2	2	952
Tuolumne	79	92	286,062
Ventura	4	--	6,783
Yolo	--	1	715
Yuba	7	42	1,806,355
Totals	1,112	1,487	$31,165,050

[a] Number does not include snipers, prospectors, and various individuals selling small lots to bullion dealers.

The following is quoted from the advance statement of gold in 1935 by courtesy of the U. S. Bureau of Mines,[b] Department of Commerce:

"Gold—The production of recoverable gold in California in 1935 is estimated at 890,430 fine ounces valued at $31,165,050, an increase of 24 per cent in quantity and value over 1934. Exact figures are not available on the proportionate contributions of lode and placer mines, but enough data have been collected to indicate substantial increases from both sources. In 1934 lode mines accounted for approximately 62 per cent of the State yield; the remaining 38 per cent came from placers. Nevada County continued to be the principal producer of gold in 1935; the bulk of its production came from the lode mines of the Grass Valley-Nevada City district. Sacramento County was the second largest producer of gold in the State, because of the great productivity of the gold dredges in the Folsom district. The Mother Lode continued to be most productive in Amador County. Dredging, principally along the Yuba River in Yuba County, accounted for much of the large gold production there. El Dorado County derived the most of its gold output from the part of the Mother Lode included within its boundaries. Although the section of the Mother Lode in Calaveras County was the principal contributor to that county's gold output, considerable production also was reported from the lode mines in its East Belt district and from placer operations in the Camanche district. In Kern County the rapidly developing

[b] U. S. Bureau of Mines, Mineral Yearbook, 1936, pp. 221–222.

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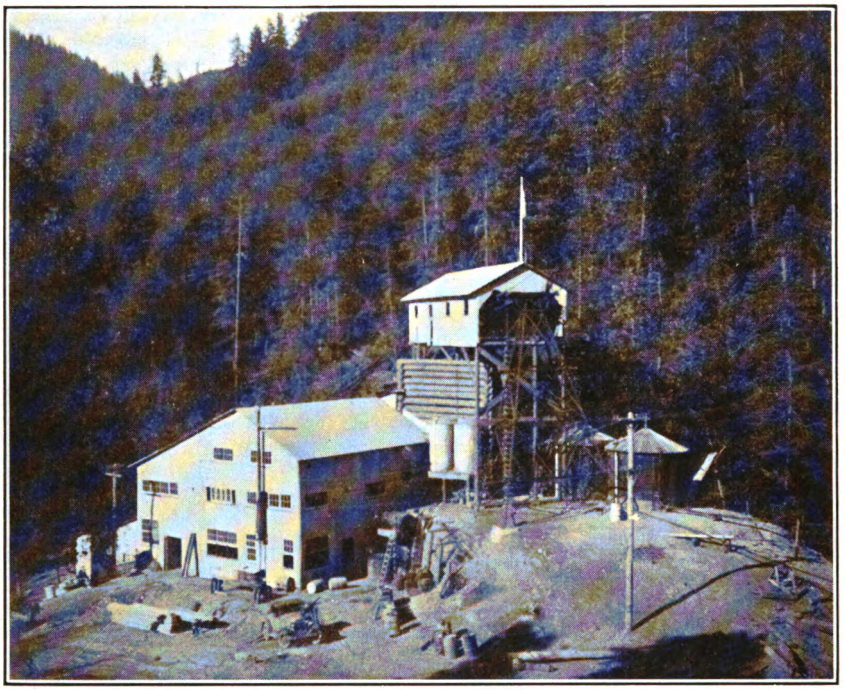
mines in the Mojave district and the rehabilitated properties in the old Randsburg district accounted for the large gold production of the county. Sierra County was important as a producer of gold largely because of the output of the Alleghany district. Among the other large gold-producing counties were Shasta, and Mariposa, which depended chiefly on lode mines for their yield; Merced, Trinity, Butte, and Stanislaus, which derived most of their gold from placer mines; and Siskiyou and Placer Counties, where the production was more evenly divided between lode and placer deposits.

"The following is a list of companies (or mines) operating lode gold mines, arranged roughly in order of their importance as producers: Empire Star Mines Co., Ltd. (Nevada County), Idaho Maryland Mines Corporation (Nevada County), Iron Mountain property of the Mountain Copper Co., Ltd. (Shasta County), Lava Cap Gold Mining Corporation (Nevada County), Argonaut Mining Co., Ltd. (Amador County), Kennedy Mining & Milling Co. (Amador County), Carson Hill Gold Mining Corporation (Calaveras County), Big Canyon Mine of the Mountain Copper Co., Ltd. (El Dorado County), Cardinal Gold Mining Co. (Inyo County), Original Sixteen to One Mine, Inc. (Sierra County), Montezuma Apex Mining Co. (El Dorado County), Tropico mine (Kern County), Central Eureka Mining Co. (Amador County), Golden



Mill and aerial tramway terminal, King Solomon Mine at Black Bear, Siskiyou County.

Photo by Walter W. Bradley.

Center mine (Nevada County), Anglo-American Mining Corporation, Ltd. (Kern County), Middle Fork Gold Mining Co. (El Dorado County), Central Tailings Co. (Amador County), Pacific Mining Co. (Mariposa County), Beebe Gold Mining Co. (El Dorado County), Spanish Mining Co. (Nevada County), Golden Queen Mining Co. (Kern County), Kenton mine (Sierra County), Lucky Boy Mining Co. (Calaveras County), Gold Reserve mine (El Dorado County), Diltz mine (Mariposa County), and Walker mine (Plumas County).

"The following are leading gold producers from placers in California, arranged roughly in order of their output in 1935: Natomas Co. (Sacramento County), Yuba Consolidated Gold Fields (Yuba County), Capital Dredging Co. (Sacramento County), Snelling Gold Dredging Co. (Merced County), Gold Hill Dredging Co. (Sacramento County), La Grange Gold Dredging Co. (Stanislaus County), Arroyo Seco Gold Dredging Co. (Amador County), Yuba Consolidated Gold Fields (Merced County), Merced Dredging Co. (Merced County), Calaveras Central (Calaveras County), Trinity Dredging Co. (Trinity County), Gold Bar Dredging Co. (Trinity County), Cal-Oro Dredging Co. (Siskiyou County), Northern California Mines Co. (Trinity County), Oroville Gold Dredging Co. (Butte County), and Wyandotte Gold Dredging Co. (Butte County).

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"Besides these larger mines many smaller producers worked lode and placer properties. Another source of much gold in California was the itinerant miner who usually works property that he does not own. Since the depression many people lacking other employment have panned for gold by hand in the streams of California with the hope of extracting enough to furnish the bare necessities of life. Although the average income of this class of miners has been pitifully small, a few of the more fortunate ones have picked up rich pockets. Exact figures are not available as to the number engaged in itinerant placer mining, but probably more than 10,000 individuals tried this method of solving their personal unemployment problem during the year."

Total Gold Production of California.

The presence of gold in stream gravels near Los Angeles was known and worked in a small way by the Indians, at least as early as 1841,[1] and possibly 1820.[2] On March 2, 1844, Don Manuel Castanares, deputy for California to the Congress of Mexico, reported[3] to his government that placers near Los Angeles had produced up to December, 1843, a total of 2000 ounces of gold dust, most of which had been sent to the United States Mint at Philadelphia.

As the padres and the rancheros discouraged the quest of gold, this early, small production caused no particular excitement. It was not until James W. Marshall's finding of gold nuggets in the tail-race of Sutter's saw mill on the American River, January 24, 1848, was heralded abroad that the great rush began, and California became a commonwealth of first rank almost over night. There are, however, no authentic data on gold production prior to 1848, other than occasional, scattered references such as above quoted.

The following table was originally compiled by Chas. G. Yale, of the Division of Mineral Resources, U. S. Geological Survey, but for a number of years statistician of the California State Mining Bureau and the U. S. Mint at San Francisco. The authorities chosen for certain periods were: J. D. Whitney, State Geologist of California; John Arthur Phillips, author of "Mining and Metallurgy of Gold and Silver" (1867); U. S. Mining Commissioner R. W. Raymond; U. S. Mining Commissioner J. Ross Browne; Wm. P. Blake, Commissioner from California to the Paris Exposition, where he made a report on "Precious Metals" (1867); John J. Valentine. author for many years of the annual report on precious metals published by Wells, Fargo & Company's Express; and Louis A. Garnett, in the early days manager of the San Francisco refinery, where records of gold receipts and shipments were kept. Mr. Yale obtained other data from the reports of the director of the U. S. Mint and the director of the U. S. Geological Survey. The authorities referred to who were alive at the time of the original compilation of this table in 1894 were all consulted in person or by letter by Mr. Yale with reference to the correctness of their published data, and the final table quoted was then made up.

The figures for 1903-1923 (inclusive) are those prepared by the U. S. Geological Survey; and since by the U. S. Bureau of Mines:

[1] Hittell, T. H., History of California, Vol. II, p. 312, 1885.
[2] Bancroft, H. H., History of California, Vol. II, p. 417, 1886.
[3] Mercantile Trust Review of the Pacific, Vol. XIV, No. 2, p. 43, Feb. 15, 1925.

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Total Gold Production of California

Year	Value	Year	Value
1848	$245,301	1893	$12,538,780
1849	10,151,360	1894	13,863,282
1850	41,273,106	1895	15,334,317
1851	75,938,232	1896	17,181,562
1852	81,794,700	1897	15,871,401
1853	67,613,487	1898	15,906,478
1854	69,433,931	1899	15,336,031
1855	55,485,395	1900	15,863,355
1856	57,509,411	1901	16,989,044
1857	43,628,172	1902	16,910,320
1858	46,591,140	1903	16,300,653
1859	45,846,599	1904	18,633,676
1860	44,095,163	1905	18,898,545
1861	41,884,995	1906	18,732,452
1862	38,854,668	1907	16,727,928
1863	23,501,736	1908	18,761,559
1864	24,071,423	1909	20,237,870
1865	17,930,858	1910	19,715,440
1866	17,123,867	1911	19,738,908
1867	18,265,452	1912	19,713,478
1868	17,555,867	1913	20,406,958
1869	18,229,044	1914	20,653,496
1870	17,458,133	1915	22,442,296
1871	17,477,885	1916	21,410,741
1872	15,482,194	1917	20,087,504
1873	15,019,210	1918	16,528,953
1874	17,264,836	1919	16,695,955
1875	16,876,009	1920	14,311,043
1876	15,610,723	1921	15,704,822
1877	16,501,268	1922	14,670,346
1878	18,839,141	1923	13,379,013
1879	19,626,654	1924	13,150,175
1880	20,030,761	1925	13,065,330
1881	19,223,155	1926	11,923,481
1882	17,146,416	1927	11,671,018
1883	24,316,873	1928	10,785,315
1884	13,600,000	1929	8,526,703
1885	12,661,044	1930	9,451,162
1886	14,716,506	1931	10,814,162
1887	13,588,614	1932	11,765,726
1888	12,750,000	1933	[a]15,683,075
1889	11,212,913	1934	[b]25,131,284
1890	12,309,793	1935	[c]31,165,050
1891	12,728,869		
1892	12,571,900	Total value	$1,936,215,491

[a] Value calculated at an average weighted price of $25.56 per fine ounce; previously $20.6718.
[b] Value calculated at an average weighted price of $34.95 per fine ounce.
[c] Value $35 per fine ounce.

IRIDIUM (see under Platinum)

IRON ORE

Bibliography: State Mineralogist Reports II, IV, V, X, XII-XV (inc.), XVII, XVIII, XXI-XXVII (inc.), XXX, XXXI. Bulletins 38, 67, 91. Am. Inst. Min. Eng., Trans. LIII. Min. & Sci. Press, Vol. 115, pp. 112, 117-122; Vol. 123, pp. 94-96, 113-114.

During 1935 there were two shipments of iron ore in California, which came from San Bernardino County. The material mined in 1934 came from a single producer each in San Bernardino and Santa Cruz counties. That coming from the first named county was hematite and used in the manufacture of high-iron cement, the latter produced magnetite. The annual details are combined under the 'Unapportioned' item to conceal the output of either operator. There are considerable deposits of iron ore known in California, notably in Shasta, Madera, Placer, Riverside, San Bernardino, and Los Angeles counties, but production has so far been limited for lack of an economic supply

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of coking coal. Some pig iron has been made, utilizing charcoal for fuel, both in blast furnaces and by electrical reduction; also, ferrochrome, ferromanganese, and ferrosilicon have been made in California.

Iron Ore Production in California, by Years.

Total iron ore production of California, with annual amounts and values, is as follows:

Year	Tons	Value	Year	Tons	Value
1881*	9,273	$79,452	1917	2,874	$11,496
1882	2,073	17,766	1918	3,108	15,947
1883	11,191	106,540	1919	2,300	13,796
1884	4,532	40,983	1920	5,975	40,889
1885			1921	1,970	12,030
1886	3,676	19,250	1922	3,588	18,868
1887			1923	3,102	18,665
1893	250	2,000	1924		
1894	200	1,500	1925 [a]	785	4,710
1895			1926		
1907	400	400	1927 [a]	5,272	26,000
1908			1928		
1909	108	174	1930		
1910	579	900	1931 [a]	100	700
1911	558	558	1932		
1912	2,508	2,508	1934		
1913	2,343	4,485	1935 [a]	38,339	163,714
1914	1,436	5,128			
1915	724	2,584	Totals	110,244	$717,043
1916	3,000	6,000$			

* Productions for the years 1881-1886 (inc.) were reported as "tons of pig iron" (U.S.G.S., Min. Res. 1885), and for the table herewith are calculated to "tons of ore" on the basis of 47.6% Fe as shown by an average of analyses of the ores (State Mineralogist Report IV, p. 242). This early production of pig iron was from the blast furnaces then in operation at Hotaling in Placer County. Charcoal was used in lieu of coke. Though producing a superior grade of metal, they were obliged finally to close down, as they could not compete with the cheaper English and eastern United States iron brought in by sea to San Francisco.

[a] Annual details concealed under 'Unapportioned.'

LEAD

Bibliography: State Mineralogist Reports IV, VIII-XV (inc.), XVII–XXVIII (inc.), XXX, XXXI.

The production of lead in California during 1935 amounted to a total of 1,142,405 pounds of recoverable metal valued at $45,695, as compared with the 1934 figures of 804,911 pounds worth $29,782. The average price of lead in 1935 was 4.0¢ per pound, compared with 3.7¢ per pound in 1934, 3.7¢ per pound in 1933, 3.0¢ per pound in 1932, 3.7¢ per pound in 1931, and 5.0¢ per pound in 1930.

Distribution of 1935 output of lead by counties was as follows:

County	*Pounds*	*Value*
Amador	3,271	$131
Inyo	578,583	23,142
Kern	2,180	87
Mariposa	1,438	57
Mono	6,305	252
Nevada	355,526	14,221
Orange	39,981	1,599
Plumas	1,331	53
Riverside	15,393	616
San Bernardino	123,776	4,951
San Diego	8,323	333
Shasta	1,747	70
Alpine, Butte, Calaveras, Contra Costa, El Dorado, Lassen, Los Angeles, Merced, Placer, Shasta, Sierra, Trinity, Tuolumne [a]	5,551	182
Totals	1,142,405	$45,695

[a] Combined to conceal the output of individual operators in each.

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Lead Production of the United States.

According to preliminary data issued by the U. S. Bureau of Mines[1] during 1935, the production of primary lead in the United States was 310,505 short tons, valued at $24,840,000, being an increase over the national production of 1934 which was 299,481 short tons worth $22,188,000.

Lead Production of California, by Years.

Statistics on lead production in California were first compiled by this Bureau in 1887. Amount and value of the output, annually, with total figures, to date, are given in the following table:

Lead Production in California, by Years

Year	Pounds	Value	Year	Pounds	Value
1877	[a] 7,836,000	$391,800	1907	328,681	$16,690
1878	8,640,000	328,320	1908	1,124,483	46,663
1879	4,502,000	191,335	1909	2,685,477	144,897
1880	4,200,000	215,460	1910	3,016,902	134,082
1881	6,680,000	325,316	1911	1,403,839	63,173
1882	[b] 4,000,000	196,800	1912	1,370,067	61,653
1883	[c] 3,400,000	145,520	1913	3,640,951	160,202
1884	3,200,000	120,512	1914	4,697,400	183,198
1885	2,000,000	80,900	1915	4,796,299	225,426
1886	2,000,000	93,400	1916	12,392,031	855,049
1887	[d] 1,160,000	52,200	1917	21,651,352	1,862,016
1888	900,000	38,250	1918	13,464,869	956,006
1889	940,000	35,720	1919	4,139,562	219,397
1890	800,000	36,000	1920	4,903,738	392,300
1891	1,140,000	49,020	1921	1,149,051	51,707
1892	1,360,000	54,400	1922	6,511,280	358,120
1893	666,000	24,975	1923	9,934,522	695,416
1894	950,000	28,500	1924	4,984,387	398,751
1895	1,592,400	49,364	1925	7,352,422	639,661
1896	1,293,500	38,805	1926	8,067,873	645,429
1897	596,000	20,264	1927	2,748,440	173,151
1898	655,000	23,907	1928	1,882,795	109,102
1899	721,000	30,642	1929	1,428,777	90,014
1900	1,040,000	41,600	1930	3,542,796	176,241
1901	720,500	28,820	1931	3,934,240	145,568
1902	349,440	12,230	1932	2,418,626	72,480
1903	110,000	3,960	1933	772,463	28,583
1904	124,000	5,270	1934	804,911	29,655
1905	533,680	25,083	1935	1,142,405	45,695
1906	338,718	19,307			
			Totals	198,738,877	$11,688,005

[a] Quantities for 1877–1881 (inc.) from C. E. Siebenthal, Mineral Resources of U. S. 1912, Part I, U. S. Geol. Survey, p. 339; and values for same years from quotations in Eng. & Min. Jour. of New York.
[b] Estimated.
[c] Quantities and values for 1883–1886 (inc.) from Mineral Resources of U. S. Geol. Surv., 1883–1886, respectively.
[d] Data from 1887 to date from reports of California State Mining Bureau.

MANGANESE

Bibliography: State Mineralogist Reports XII–XV (inc.), XVIII, XXII–XXVII (inc.), XXIX–XXXI. Bulletins 38, 67, 76, 91. U. S. G. S. Bull. 427. Eng. & Min. Jour.-Press, Vol. 117, p. 545.

During 1935 in California there were shipments of manganese ore coming from a single property in Riverside County; these shipments were consumed in the steel mills of the State. The material shipped in 1934 came from a single property each in Lake, Riverside, and San

[1] U. S. Bureau of Mines Mineral Market Report 455, May 19, 1936.

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Bernardino counties. The annual details are concealed under the 'Unapportioned' item as one operator made all the shipments.

Imports of foreign manganese ore into the United States[1] during 1935, mainly from Soviet Russia, Gold Coast, Cuba, and Brazil, amounted to 383,498 long tons of ore containing 189,254 long tons of manganese valued at $4,208,673, as compared with 341,339 long tons containing 165,840 long tons of manganese worth $3,529,182.

The Tariff Act of 1930 provides for an import duty of 1¢ per pound on the metallic manganese contained, for "manganese ore (including ferruginous manganese ore) or concentrates containing in excess of 10 per centum of metallic manganese."

Manganese Ore Production in California, by Years.

Production of manganese ore in California began at the Ladd Mine, San Joaquin County, in the Tesla District in 1867. When shipments of this ore to England ceased late in 1874, upwards of 5000 tons had been produced by that property. For some years following that, the output was small. The tabulation herewith shows California's ouput of manganese ore, annually, since 1887, when the compilation of such figures was begun by the State Mining Bureau:

Year	Tons	Value	Year	Tons	Value
1887	1,000	$9,000	1912	22	$400
1888	1,500	13,500	1913		
1889	53	901	1914	150	1,500
1890	386	3,176	1915	4,013	49,098
1891	705	3,830	1916	13,404	274,601
1892	300	3,000	1917	15,515	396,659
1893	270	4,050	1918	26,075	979,235
1894	523	5,512	1919	11,569	451,422
1895	880	8,200	1920	2,892	62,323
1896	518	3,415	1921	1,005	12,210
1897	504	4,080	1922	540	7,650
1898	440	2,102	1923	690	10,620
1899	295	3,165	1924	1,115	25,785
1900	131	1,310	1925	832	19,450
1901	425	4,405	1926	235	4,700
1902	870	7,140	1927		
1903	1	25	1928*	733	8,216
1904	60	900	1929*		
1905			1930*	207	2,576
1906	1	30	1931*		
1907	1	25	1932		
1908	321	5,785	1934*	432	4,630
1909	3	75	1935*		
1910	265	4,235			
1911	2	40	Totals	88,883	$2,398,976

* Annual details concealed under 'Unapportioned.'

MOLYBDENUM

Bibliography: State Mineralogist Reports XIV, XVII-XXIV (inc.), XXVI-XXVIII (inc.), XXX. Bulletins 67, 91. U. S. Bur. of Min., Bulletin 111. Proc. Colo. Sci. Soc., Vol. XI.

Molybdenum is used as an alloy constituent in the steel industry, and in certain forms of electrical apparatus. Included in the latter is its successful substitution for platinum and platinum-iridium in electric contact-making and -breaking devices. In alloys it is used similarly to and in conjunction with chromium, cobalt, iron, manganese, nickel, tungsten, and vanadium. The oxides and the ammonium salt have important chemical uses.

[1] U. S. Bureau of Foreign and Domestic Commerce, Monthly Summary, Dec., 1934.

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The two principal molybdenum minerals are: the sulphide, molybdenite, and wolfenite, lead molybdate; the former furnishing practically the entire commercial output. Molybdenite is found in or associated with acidic igneous rocks, such as granite and pegmatite.

Deposits of disseminated molybdenite are known in several localities in California, and in at least two places it occurs in small masses associated with copper sulphides. The first recorded commercial shipments of molybdenum ore in California were during the war 1916–1918. Some development work has been recently done on a high-grade deposit at the head of the Kaweah River, Tulare County.

The Tariff Act of 1930 provides for an import duty of 35 cents a pound for the metallic molybdenum content of molybdenum ores or concentrates.

The present (Feb. 25, 1937) quotations on molybdenum ores are 42¢ per pound of MoS_2 contained, delivered at Pittsburgh, Pa., and on ferromolybdenum are 95¢ per pound Mo, 50%-60% Mo f.o.b. shipping point.

During 1935 there was no production of molybdenum ore reported mined in California. In 1933 and 1934 there were shipments of molybdenum concentrates in California amounting to 1432 pounds 91.23% MoS_2 valued at $306. The annual details are combined under the 'Unapportioned' item to conceal the output of either operator. The material shipped in 1933 came from Inyo County and had been mined for several years, and that shipped in 1934 came from Mono County and was mined in 1933.

Molybdenum Production of California, by Years.

California's production of molybdenum ore by years is summarized in the following tabulation:

Year	*Tons*	*Value*
1916	8	$9,945
1917	243	9,014
1918	*	300
1919	---	------
1933 } 1934 } [a]	[b]	306
Totals	252	$19,565

* 300 pounds of 90% MoS_2 concentrate.
[a] Annual details concealed under 'Unapportioned.'
[b] 1432 pounds of 91.23% MoS_2 concentrates.

NICKEL

Bibliography: State Mineralogist Reports XIV, XVII, XXIV, XXV, XXVIII, XXX. U. S. G. S., Bulletin 640-D. U. S. Bureau of Standards, Circular 100.

Nickel occurs in the Friday Copper Mine in the Julian District, San Diego County. The ore is a nickel-bearing pyrrhotite, with some associated chalcopyrite. Some ore has been mined in the course of development work but not treated nor disposed of, as they were unable to get any smelter to handle it for them. Nickel ore has also been reported from other localities in California, but not yet confirmed.

Present (Aug. 1, 1935) quotations for nickel are around 35¢-36¢ per pound for the refined metal.

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OSMIUM (see under Platinum)

PALLADIUM (see under Platinum)

PLATINUM

Bibliography: State Mineralogist Reports IV, VIII, IX, XII–XXVI (inc.), XXVIII, XXX, XXXI. Bulletins 38, 45, 67, 85, 91, 92. U. S. Geol. Surv., Bulletins 193, 285. Trans. Am. Inst. Min. Eng., Vol. 47, pp. 217–218.

In California the platinum group metals are obtained as a by-product from placer operations for gold. The major portion of it comes from the dredges working in Amador, Butte, Sacramento, Stanislaus, Shasta and Yuba counties, with a small amount coming from the hydraulic and surface-sluicing mines of Del Norte, Humboldt, Siskiyou and Trinity counties.

The output of the platinum-group metals in California during 1935 amounted to 536 ounces crude, of which 147 ounces crude containing 121 fine ounces were sold and had a value to the miner of $4,153. This metal came from properties in Calaveras, Merced, Sacramento, Stanislaus, Trinity, and Yuba counties. The 1934 yield was 520 ounces crude containing 424 fine ounces worth $14,884 (some of the above material was mined before 1934 but not sold until then). Of the material sold in 1935, 59 fine ounces were platinum; 21 fine ounces, iridium; 24 fine ounces, osmium; and 17 fine ounces, ruthenium. Of the 424 fine ounces sold in 1934, 302 fine ounces were platinum, 45 fine ounces iridium, 50 fine ounces osmium; 25 fine ounces, ruthenium, and 2 fine ounces, palladium.

Prices.

The average prices during 1935 for the various platinum-group metals per fine ounce, according to refiners' reports, as given by the U. S. Bureau of Mines[1] were: platinum, $32.60; palladium, $23.25; iridium, $50.90; osmium, $51; rhodium, $44; and ruthenium, $39, compared with 1934 prices which were: platinum, $34.50; palladium, $22.54; iridium, $74; osmium, $63; rhodium, $44.10; and ruthenium, $37.40.

[1] U. S. Bureau of Mines, Mineral Market Report 379, August 14, 1935.

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Platinum Production of California, by Years.

The annual production and values since 1887 have been as follows:

Year	Ounces	Value	Year	Ounces	Value
1887	416	$10,400	1912	603	$19,731
1888	100	400	1913	368	17,738
1889	500	2,000	1914	463	14,816
1890	500	2,000	1915	667	21,149
1891	600	2,500	1916	886	42,642
1892	100	500	1917	610	43,719
1893	80	440	1918	571	42,788
1894	75	517	1919	*418	60 611
1895	100	600	1920	477	68,977
1896	150	900	1921	613	58,754
1897	162	944	1922	795	90,288
1898	150	900	1923	602	78,546
1899	300	1,800	1924	273	36,452
1900	300	1,800	1925	292	39,937
1901	400	2,500	1926	322	32,005
1902	250	3,200	1927	139	10,749
1903	39	468	1928	312	27,902
1904	70	1.052	1929	212	14,416
1905	123	1,849	1930	217	11,700
1906	200	3.320	1931	305	11,979
1907	91	1,647	1932	278	8,142
1908	300	6,255	1933	236	7,255
1909	706	13.414	1934	424	14,884
1910	337	8.386	1935	121	4,153
1911	511	14,873	Totals	16,758	$861,998

* Fine ounces, beginning with 1919.

QUICKSILVER

Bibliography: State Mineralogist Reports IV, V, XII–XV, XVII–XXIX (inc.), XXXI, XXXII. Bulletin 27, 78, 91. U. S. Geol. Surv., Monograph XIII. U. S. Bur. of Mines, Tech. Papers 96, 227; Bulletin 222, 335.

The production of quicksilver in California during the year 1935 amounted to 9353 flasks valued at $628,590. This was an increase in both amount and value over the 1934 figures which were 7946 flasks worth $534,135. The distribution of the 1935 output by counties was as follows:

County	*Flasks*	*Value*
Lake	4,097	$285,426
Napa	1,109	60,649
San Benito	791	55,015
San Luis Obispo	2,474	167,613
Santa Barbara	110	7,854
Sonoma	81	5,474
Colusa, Fresno, Inyo, Kings, Monterey, Trinity *	308	20,058
Totals	9,353	$628,590

* Combined to conceal the output of individual operators in each.

Prices.

During 1935 the average for New York monthly quotations [1] was $71.992 per 76-lb. flask. The average price for 1934 was $73.865. The average price for January, 1935 was $72.76, dropping to $69 in August and raising to the end of the year with an average for December of $75.20. The average price received by producers in California during 1935 was $67.23 per 76-lb. flask, compared with $67.32 per flask in 1934.

[1] Engineering & Mining Journal Vol. 136, 1935.

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The U. S. Bureau of Mines[1] reported the total production of the United States for 1935 at 17,518 flasks valued at $1,261,121. The national production for 1934 was 15,445 flasks worth $1,140,845. California was by a considerable margin the largest producing state, with approximately 52 per cent of the total, other producing states being Oregon, Texas, Arkansas, Washington, Nevada, and Arizona. The 1935 imports of quicksilver amounted to 7815 flasks compared with 10,192 flasks in 1934, a decrease of 23 per cent. Of total imports for 1935, Spain supplied 6856 flasks, Italy 904 flasks, and Mexico 55 flasks. Of the 1934 imports, Spain was credited with 7053 flasks, Mexico 2480 flasks, Italy 649 flasks, and Sweden 10 flasks. At the end of 1935 there were 3582 flasks of mercury in bonded warehouses compared with 4346 flasks on hand at the end of 1934.

Total Quicksilver Production of California.

Total amount and value of the quicksilver production of California, as given in available records, are shown in the following tabulation. Though the New Almaden Mine in Santa Clara County was first worked in 1824, and has been in practically continuous operation since 1846 (the yield being small the first two years), there are no available data on the output earlier than 1850. Previous to June, 1904, a 'flask' of quicksilver contained 76½ pounds; then 75 pounds up to and including 1927; beginning with 1928, 76 pounds. In compiling this table the following sources of information were used: for 1850–1883, table by J. B. Randol, in Report of State Mineralogist IV, p. 336; 1883–1893, U. S. Geological Survey reports; 1894 to date, statistical bulletins of the State Mining Bureau; also State Mining Bureau, Bulletin 27, "Quicksilver Resources of California," 1908, p. 10.

[1] U. S. Bureau of Mines Mineral Market Rept. 467, June 24, 1936.

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Year	Flasks	Value	Average price per flask	Year	Flasks	Value	Average price per flask
1850	7,723	$768,052	$99 45	1894	30,416	$934,000	$30 70
1851	27,779	1,859,248	66 93	1895	36,104	1,337,131	37 04
1852	20,000	1,166,600	58 33	1896	30,765	1,075,449	34 96
1853	22,284	1,235,648	55 45	1897	26 691	993,445	37 28
1854	30,004	1,663,722	55 45	1898	31,092	1,188,626	38 23
1855	33,000	1,767,150	53 55	1899	29,454	1,405,045	47 70
1856	30,000	1,549,500	51 65	1900	26,317	1,182,786	44 94
1857	28,204	1,374,381	48 73	1901	26,720	1,285,014	48 46
1858	31,000	1,482,730	47 83	1902	29,552	1,276,524	43 20
1859	13,000	820,690	63 13	1903	32,094	1,335,954	42 25
1860	10,000	535,500	53 55	1904	[a] 28,876	1,086,323	37 62
1861	35,000	1,471,750	42 05	1905	24,655	886,081	35 94
1862	42,000	1,526,700	36 35	1906	19,516	712,334	36 50
1863	40,531	1,705,544	42 08	1907	17,379	663,178	38 16
1864	47,489	2,179,745	45 90	1908	18,039	763,520	42 33
1865	53,000	2,432,700	45 90	1909	16,217	773,788	47 71
1866	46,550	2,473,202	53 13	1910	17,665	799,002	45 23
1867	47,000	2,157,300	45 90	1911	19,109	879,205	46 01
1868	47,728	2,190,715	45 90	1912	20,600	866,024	42 04
1869	33,811	1,551,925	45 90	1913	15,661	630,042	40 23
1870	30,077	1,725,818	57 38	1914	11,373	557,846	49 05
1871	31,686	1,999,387	63 10	1915	14,199	1,157,449	81 52
1872	31,621	2,084,773	65 93	1916	21,427	2,003,425	93 50
1873	27,642	2,220,482	80 33	1917	24,382	2,396,466	98 29
1874	27,756	2,919,376	105 18	1918	22,621	2,579,472	114 03
1875	50,250	4,228,538	84 15	1919	15,200	1,353,381	89 04
1876	75,074	3,303,256	44 00	1920	10,278	775,527	75 45
1877	79,396	2,961,471	37 30	1921	3,157	140,666	44 56
1878	63,880	2,101,652	32 90	1922	3,466	191,851	55 35
1879	73,684	2,194,674	29 85	1923	5,458	332,851	60 98
1880	59,926	1,857,706	31 00	1924	7,948	543,080	68 33
1881	60,851	1,815,185	29 83	1925	7,683	621,831	80 81
1882	52,732	1,488,624	28 23	1926	5,892	516,382	87 64
1883	46,725	1,343,344	28 75	1927	6,488	714,418	111 67
1884	31,913	973,347	30 50	1928	[b] 7,107	844,649	118 84
1885	32,073	986,245	30 75	1929	10,152	1,195,705	117 78
1886	29,981	1,064,326	35 50	1930	11,374	1,255,257	110 36
1887	33,760	1,430,749	42 38	1931	13,478	1,121,624	83 22
1888	33,250	1,413,125	42 50	1932	5,349	279,780	52 30
1889	26,464	1,190,880	45 00	1933	4,102	229,472	55 94
1890	22,926	1,203,615	52 50	1934	7,946	534,135	67 22
1891	22,904	1,036,406	45 25	1935	9,353	628,590	67 23
1892	27,993	1,139,595	40 71				
1893	30,164	1,108,527	36 75	Totals	2,794,780	$115,851,134	

[a] Flasks of 75 lbs. since June, 1904; of 76½ lbs. previously.
[b] Flasks of 76 pounds, from January, 1928.

SILVER

Bibliography: State Mineralogist Reports IV, VIII, XII–XXXI (inc.). Bulletins 67, 91, 108. Min. & Sci. Press, March 1, 1919.

The 1935 silver output in California totaled 1,191,112 fine ounces valued at $856,112, being an increase in both amount and value over the figures of the previous year which were 844,413 fine ounces worth $545,883. Of the 1935 yield there were 23,902 fine ounces worth $17,180 from placers. The average price paid for newly mined domestic silver was 71.875¢ per fine ounce during 1935, compared with 64.6¢ per fine ounce in 1934, 35¢ per fine ounce in 1933, and 28.2¢ per fine ounce in 1932.

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Distribution of the 1935 silver production by counties was as follows:

County	*Fine ounces*	*Value*
Alpine	226	$162
Amador	24,534	17,634
Butte	5,923	4,257
Calaveras	11,434	8,218
Colusa	9	6
Del Norte	5	3
El Dorado	8,268	5,943
Fresno	166	119
Humboldt	98	70
Imperial	4,147	2,981
Inyo	38,429	27,621
Kern	147,447	105,978
Lassen	396	285
Los Angeles	5,753	4,135
Madera	116	83
Mariposa	6,835	4,913
Merced	3,841	2,761
Modoc	11	8
Mono	101,056	72,634
Monterey	1	1
Napa	11,785	8,470
Nevada	520,362	374,010
Orange	15,461	11,113
Placer	18,941	13,614
Plumas	47,864	34,402
Riverside	2,717	1,953
Sacramento	4,400	3,163
San Bernardino	159,633	114,736
San Diego	90	65
San Joaquin	151	109
Santa Cruz	8	6
Shasta	33,121	23,805
Sierra	4,532	3,257
Siskiyou	2,240	1,610
Stanislaus	1,064	765
Trinity	3,487	2,506
Tulare	13	9
Tuolumne	2,753	1,979
Ventura	44	32
Yuba	3,751	2,696
Totals	1,191,112	$856,112

The following paragraph is quoted from the U. S. Bureau of Mines,[1] chapter on Gold and Silver from Mineral Year Book 1936, by courtesy of Charles White Merrill and H. M. Gaylord:

"Silver—Production of recoverable silver in California in 1935 is estimated at 1,191,112 fine ounces valued at $856,112 compared with 844,413 fine ounces valued at $545,883 in 1934. This represents an increase of 42 per cent in quantity and 58 per cent in value. Virtually all the silver in California was produced as a by-product of gold mining. The companies producing the largest quantities, listed approximately in the order of their importance, were as follows: Lava Cap Gold Mining Corporation (Nevada County), Empire Star Mines Co., Ltd. (Nevada County), Spanish Mining Co. (Nevada County), Walker Mining Co. (Plumas County), Golden Queen Mining Co. (Kern County), and Coyote mine (San Bernardino County). This list contains some of the leading gold mines of the State. The Walker mine is principally a copper producer, and although the Coyote mine derived most of its revenue from silver, its gold was an important byproduct. Many smaller properties, most of which were gold mines, including some placers, supplied the remainder of the silver. Dredges, all of which were operated primarily for gold, found silver a profitable byproduct."

Silver Production of California, by Years.

The amount and value of the silver production of California, and the average price, annually, since 1880 are given in the table following. In the table shown in the statistical bulletins previous to Bulletin 97 (for 1925), the values shown for 1880–1904 (inc.) were taken from the reports of the Director of the Mint, of which the figures for 1880–1896 (inc.) were based on 'coinage value' ($1.2929 per fine ounce). We

[1] U. S. Bureau of Mines Mineral Year Book 1936, p. 222.

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have recalculated these to commercial value, using the price table of the U. S. Geological Survey (McCaskey, H. D.), Gold and Silver, 1913: Mineral Resources of the U. S., Part I, p. 847). From 1905 to date, the figures are those of the U. S. Geological Survey and its successors, the U. S. Bureau of Mines. Figures for the years prior to 1880 are not available, as there were no reliable records compiled.

Silver Production of California, by Years, Since 1880

Year	Fine oz.	Value	Average price per oz.	Year	Fine oz.	Value	Average price per oz.
1880	882,169	$1,014,494	$1 15	1909	2,098,253	$1,091,092	$0 52
1881	580,091	655,503	1 13	1910	1,840,085	993,646	54
1882	653,569	745,069	1 14	1911	1,270,445	673,336	53
1883	1,129,244	1,253,461	1 11	1912	1,300,136	799,584	615
1884	3,236,987	3,593,056	1 11	1913	1,378,399	832,553	604
1885	1,986,260	2,125,298	1 07	1914	1,471,859	813,938	553
1886	1,245,747	1,233,290	0 99	1915	1,678,756	851,129	507
1887	1,262,282	1,237,036	0 98	1916	2,564,354	1,687,345	658
1888	1,314,874	1,235,982	0 94	1917	1,775,431	1,462,955	824
1889	823,947	774,510	0 94	1918	1,427,711	1,427,711	1 00
1890	820,336	861,353	1 05	1919	1,107,189	1,240,051	1 12
1891	737,224	729,852	0 99	1920	1,706,327	1,859,896	1 09
1892	358,575	311,960	87	1921	3,629,223	3,629,223	1 00
1893	415,468	324,065	78	1922	3,100,065	3,100,065	1 00
1894	229,896	144,834	63	1923	3,559,443	2,918,743	82
1895	463 911	301,542	65	1924	3,555,133	2,381,952	67
1896	326,757	222,195	68	1925	3,054,416	2,119,765	694
1897	754,648	452,789	60	1926	2,022,460	1,262,015	624
1898	701,788	414,055	59	1927	1,620,242	918,677	567
1899	855,869	513,521	60	1928	1,478,771	865,081	585
1900	1,168,157	724,257	62	1929	1,176,895	627,285	533
1901	950,831	570,499	60	1930	1,622,803	624,779	385
1902	1,163,041	616,412	53	1931	867,818	251,667	290
1903	958,230	517,444	54	1932	493,533	139,176	282
1904	1,441,259	835,929	58	1933	402,591	140,907	350
1905	1,076,174	650,009	61	1934	844,413	545,883	[a]644
1906	1,220,641	817,830	68	1935	1,191,112	856,112	[a]719
1907	1,138,856	751,646	66				
1908	1,647,278	873,057	53	Totals	78,781,792	$58,615,514	

[a] Average price applied to newly mined within the United States.

TUNGSTEN

Bibliography: Reports XV, XVII, XVIII, XXII, XXIV, XXVII (inc.) XXX. Bulletins 38, 67, 91, 95, U. S. G. S., Bull. 652. Proc. Colo. Sci. Soc., Vol. XI. South Dakota School of Mines, Bulletin No. 12. Eng. and Min. Jour.-Press, Vol. 113, pp. 666–669, Apr. 22, 1922.

The commercial production of tungsten ores and concentrates in California began in 1905; and has been continuous since, with the exception of 1920–1922 (inclusive). The material shipped in 1935 was high-grade sorted ore and concentrates, coming from a single property in Kern County and two in San Bernardino County. A total of 125 short tons were reported shipped, yielding 118 tons recalculated to 60% WO_3 valued at $194,542. The 1935 output showed a decrease in both quantity and value as compared with that of 1934, which was 261 tons worth $224,417.

Quotations in "Metal and Minerals Markets" during 1935 ranged from $16 to $17.25 per unit WO_3 for Chinese wolframite, duty paid; and $14.50 to $17 for domestic scheelite. The highest prices were received at the end of the year. Present (April 1937) prices per unit

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WO_3 at New York are: Chinese wolframite, duty paid, $16; Bolivian scheelite, $16; domestic scheelite, $16.

Imports of foreign tungsten ores and alloys into the United States during 1935, according to the U. S. Bureau of foreign and Domestic Commerce totaled 1,587,313 pounds valued at $383,656, compared with 1,570,211 pounds worth $339,634 in 1934. The Tariff Act of 1930 raised the duty on tungsten ore or concentrates to 50 cents per pound on the metallic tungsten contained therein. Duties are also provided for imported tungsten-bearing alloys.

Tungsten ore has been produced in California principally in the Atolia-Randsburg district in San Bernardino and Kern counties, followed by the Bishop district in Inyo County, with small amounts coming from Nevada County and from the district near Goffs, in eastern San Bernardino. Most of California's tungsten ore is scheelite (calcium tungstate), though wolframite (iron-manganese tungstate) and hübernite (manganese tungstate) also occur. The deposits at Atolia are the largest and most productive scheelite deposits known.

Total Tungsten Ore Production of California.

The annual amount and value of tungsten ores and concentrates produced in California since the inception of the industry is given herewith, with tonnages recalculated to 60% WO_3:

Year	Tons at 60% WO_3	Value	Year	Tons at 60% WO_3	Value
1905	57	$18,800	1923	34	$19,126
1906	485	189,100	1924	781	446,009
1907	287	120,587	1925	573	348,475
1908	105	37,750	1926	441	316,560
1909	577	190,500	1927		
1910	457	208,245	1928	* 398	429,237
1911	387	127,706	1929	150	106,280
1912	572	206,000	1930		
1913	559	234,673	1931	* 120	82,582
1914	420	180,575	1932	26	9,509
1915	962	1,005,467	1933	148	76,605
1916	2,270	4,571,521	1934	261	224,417
1917	2,466	3,079,013	1935	118	194,542
1918	1,982	2,832,222			
1919	214	219,316	Totals	14,850	$15,474,713
1920					

* Annual details concealed under 'Unapportioned.'

TIN

Bibliography: Reports XV, XVII, XVIII, XXV, XXXI. Bulletins 67, 91.

In 1928 and 1929 there was a small amount of tin produced from California ore as well as considerable development work which was done at the Temescal mine in Riverside County near Corona. There was an output from the district during 1891-1892 as tabulated below. Small quantities of stream tin have been found in some of the placer workings in northern California, but never in paying amounts.

Two occurrences have also been noted, in northern San Diego County. Crystals of cassiterite were found there, associated with blue tourmaline crystals, amblygonite and beryl. No commercial quantity has been developed, only small pockets have been taken out.

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Total Output of Tin in California

Year	Pounds	Value
1891	125,289	$27,564
1892	126,000	32,400
1928} 1929} *	1,200	580
Totals	252,489	$60,544

* Annual details concealed under 'Unapportioned.'

TITANIUM

Bibliography: State Mineralogist's Report XXIII.

During 1934 there was no production of titanium ores reported in California. In 1927 the first recorded shipments of titanium minerals were made in California. The total of the 1927 and 1928 production was 10,013 tons valued at $150,195. All of this came from Los Angeles County and was produced from either the beach black sands which contained approximately 20% titaniferous iron and magnetite, the gangue being silica and several silicates, or from a lode deposit in the San Gabriel Mountains.

The market price of titanium minerals varies as to the titanium oxide it contains. Present (Mar. 4, 1936) quotations are: Rutile 94% TiO at 10¢ a pound, ilmenite 45 to 52% TiO at $10 to $12 a ton, all prices Atlantic seaboard.

VANADIUM

Bibliography: Reports XV, XXVI. Bulletins 67, 91. Proc. Colo. Sci. Soc., Vol. XI. U. S. Bur. of Mines, Bulletin 104.

No commercial production of vanadium has yet been made in California. Occurrences of this metal have been found at Camp Signal, near Goffs, in San Bernardino County, and two companies at one time did considerable development work in the endeavor to open up paying quantities. Some ore carrying lead vanadate has beeen developed in the 29 Palms, or Washington district, on the line between Riverside and San Bernardino counties, but no shipments reported.

Present New York quotations for ferrovanadium are $2.70-$2.90 per pound of vanadium f.o.b. works, and vanadium ore 27½¢ per pound V_2O_5 contained.

ZINC

Bibliography: State Mineralogist Reports XIV, XV, XVII, XVIII, XX-XXIV, XXVI, XXVII, XXX. Bulletins 38, 67, 91.

The recoverable zinc mined in California during 1935 amounted to 328,013 pounds valued at $14,432, compared with the 1934 output of 721,719 pounds worth $31,034. The 1935 output came from Inyo and Orange counties.

The zinc ores of Shasta and Calaveras counties are associated with copper, while those of Inyo, Los Angeles and San Bernardino are associated principally with lead-silver and zinc-silver ores.

The production of metallic zinc[1] at reduction plants in the United States during 1935 amounted to 449,284 short tons valued at $39,537,000 of which 6,450 tons were reduced from foreign ores and 28,650

[1] U. S. Bureau of Mines, Mineral Market Report 427, Jan. 6, 1936.

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tons from secondary metal. The 1935 output was an increase over that of 1934, which was 383,281 short tons worth $32,912,000.

The average price per pound for zinc in 1935 was 4¢, compared with 4.3¢ in 1934, 4.2¢ in 1933, 3.0¢ in 1932, and 3.8¢ in 1931.

Total Zinc Production of California.

Total figures for zinc output of the state are as follows, commercial production dating back only to 1906:

Year	Pounds	Value	Year	Pounds	Value
1906	206,000	$12,566	1921	846,184	$42,309
1907	177,759	10,598	1922	3,034,430	172,963
1908	54,000	3,544	1923		
1909			1924	3,060,000	198,900
1910			1925	11,546,602	877,542
1911	2,679,842	152,751	1926	20,447,559	1,533,568
1912	4,331,391	298,866	1927	8,625,004	552,000
1913	1,157,947	64,845	1928		
1914	399,641	20,381	1929		
1915	13,043,411	1,617,383	1931	149,865	5,314
1916	15,950,565	2,137,375	1932		
1917	11,854,804	1,209,190	1933	290,222	12,189
1918	5,565,516	506,466	1934	721,719	31,034
1919	1,384,192	101,046	1935	328,013	14,432
1920	1,188,009	96,229	Totals	107,042,723	$9,671,491

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STRUCTURAL MATERIALS

Bibliography: State Mineralogist Reports XII-XXXII (inc.). Bulletin 38. Spurr and Wormser, "Marketing of Metals and Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

As indicated by this subdivision heading, the mineral substances herein considered are those more or less directly used in building and structural work. California is independent, so far as these are concerned, and almost any reasonable construction can be made with materials produced in the State. Chromite, which previous to 1933 was listed under structural material in the statistical reports of the State Division of Mines, is now transferred to the metals group, thus coinciding with the practice of the United States Bureau of Mines.

This branch of the mineral industry for 1935 was valued at $18,794,298, as compared with a total of $22,837,446 for the year 1934. All the materials grouped under this classification showed an increase in 1935, with the exception of cement, miscellaneous stone, marble, and slate.

In 1935 all counties, with the exception of Sutter, contributed to this structural total. There is not a county in the fifty-eight counties of the State which is not capable of producing at least one of the materials under the classification and in 1926 every county contributed one or more substances to the group.

The following summary shows the value of the structural materials produced in California during the years 1934-1935, with increases or decreases in each instance:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Brick and hollow building tile		$1,644,661		$1,855,343	$201,682+
Cement	8,936,085 bbls.	12,445,616	8,086,292 bbls.	10,120,721	2,315,895—
Granite		249,083		339,917	90,834+
Lime	32,500 tons	309,765	59,731 tons	573,212	263,447+
Marble[a]		10,759		9,884	875—
Sandstone		14,245		9,268	4,977—
Slate		24,245		40,912	16,667+
Stone, miscellaneous		7,131,330		5,571,041	1,560,289—
Unapportioned		[b]249,125		[c]317,148	68,023+
Total values		$22,078,829		$18,837,446	
Net decrease					$3,241,383—

[a] Includes onyx and travertine.
[b] Includes bituminous rock, magnesite, paving blocks, tube-mill pebbles.
[c] Includes bituminous rock, magnesite, tube-mill pebbles.

ASPHALT

Bibliography: State Mineralogist Reports VII, X, XII–XV (inc.), XVII, XVIII. Bulletins 16, 32, 63, 67, 69, 91.

Asphalt was for a number of years accounted for in the statistical reports by the State Mining Bureau, because in the early days of the

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oil industry, considerable asphalt was produced from outcroppings of oil sand, and was a separate industry from the production of oil itself. However, at the present time most of the asphalt comes from the oil refineries, which produce a better and more uniform grade; hence, its value is not now included in the mineral total, as to do so would be in part a duplication of the crude petroleum figures. Such natural asphalt as is at present mined is in the form of bituminous sandstones, and is recorded under that designation.

BITUMINOUS ROCK

Bibliography: State Mineralogist Reports XII, XIII, XV,XVII, XVIII, XXI, XXII, XXV, XXVI, XXXI.

This material is essentially an uncemented sandstone which is saturated with and held together by a natural asphaltic constituent, probably the residue from the evaporation of a crude petroleum deposit. Bituminous rock is still used to a limited extent for road dressing in those districts adjacent to available deposits, though the manufacture of asphalt at the oil refineries has almost entirely superseded the direct use of the native material. Some of the Santa Cruz County production is put on the market as a material which can be laid cold. This material is especially applicable and valuable for patch jobs.

During 1935 shipments of bituminous rock were made from Santa Barbara and Santa Cruz counties with a single producer in each. The annual details are concealed under the 'Unapportioned' item so as not to reveal the output of either operator. The total of the 1933 and 1934 yield was 36,793 short tons valued at $130,301. The 1935 output showed a decrease in both amount and value from that of 1934.

Bituminous Rock Production of California, by Years.

The following tabulation shows the total amount and value of bituminous rock quarried and sold in California, from the records compiled by the State Mining Bureau, annually since 1887:

Year	Tons	Value	Year	Tons	Value
1887	36,000	$160,000	1913	37,541	$78,479
1888	50,000	257,000	1914	66,119	166,618
1889	40,000	170,000	1915	17,789	61,468
1890	40,000	170,000	1916	19,449	66,561
1891	39,962	154,164	1917	5,590	18,580
1892	24,000	72,000	1918	2,561	9,067
1893	32,000	192,036	1919	4,614	18,537
1894	31,214	115,193	1920	5,450	27,825
1895	38,921	121,586	1921	8,298	43,192
1896	49,456	122,500	1922	4,624	13,570
1897	45,470	128,173	1923	2,945	11,780
1898	46,836	137,575	1924	6,040	14,922
1899	40,321	116,097	1925	2,681	10,724
1900	25,306	71,495	1926	3,863	21,577
1901	24,052	66,354	1927	3,515	17,704
1902	33,490	43,411	1928	4,966	33,332
1903	21,944	53,106	1929	3,320	14,360
1904	45,280	175,680	1930	8,525	36,075
1905	24,753	60,436	1931 *	23,653	109,140
1906	16,077	45,204	1932		
1907	24,122	72,835	1933 *	36,793	130,301
1908	30,718	109,818	1934		
1909	34,123	116,436	1935	*	*
1910	87,547	165,711			
1911	75,125	117,279	Totals	1,269,126	$4,005,868
1912	44,073	87,467			

* Annual details concealed under 'Unapportioned.'

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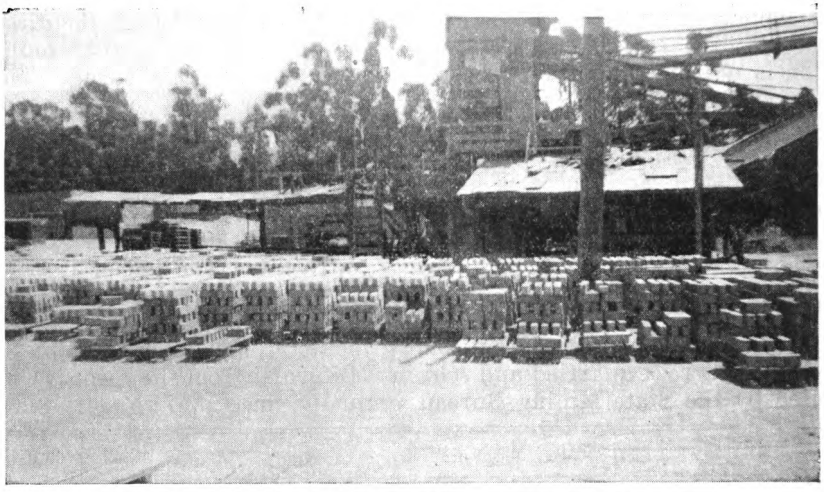
BRICK AND HOLLOW TILE

Bibliography: State Mineralogist Reports VIII, X, XII–XV (inc.), XVII–XXVIII (inc.), XXXII. Bulletins 38, 99. Preliminary Report No. 7. Cal. Jour. of Development, June, 1925, pp. 5–6.

Bricks of many varieties and in important quantities are annually produced in California, as might be expected in a state with such diversified and widespread mineral resources. The varieties include common, fire, pressed, glazed, enamel, fancy, vitrified, sand-lime, and others. Not only do the plants here supply practically all of our own requirements in these products, but considerable quantities are shipped to contiguous territory and certain products are shipped over a much wider radius.

We also include under this heading the various forms of hollow building 'tile' or blocks. The application of this tile to residence construction as well as to other structures has grown, and their total out-



Plant of San Luis Brick Works at San Luis Obispo.
Photo by Herbert A. Franke.

put for 1935 showed an increase in value and tonnage as compared with the 1934 production.

The 1935 output of all kinds of brick showed an increased value of 14 per cent and an increased amount of 13 per cent as compared with that of 1934. The 1935 production consisted of 56,497 M of common brick valued at $630,509; 17,771 M of fire brick valued at $985,832; 2453 M of glazed, pressed, fancy, and vitrified paving-brick valued at $67,117; and 21,309 tons of hollow building title valued at $171,885; which gave a total value for the year for brick and hollow building tile of $1,855,343. The 1934 output had a total value of $1,644,661.

Los Angeles County had the largest output of brick and building tile in 1935 with seventeen companies producing 29,709 M of common brick worth $313,561; 8168 M of fire brick worth $514,778; 645 M of fancy glazed and pressed brick worth $22,076; and 1167 tons of hollow

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building tile worth $11,193. Alameda County had five operating plants by four companies with an output having a total value of $218,988; Contra Costa County with three operating plants had a production with a total value of $368,028; Sacramento with three plants, produced an output worth $77,562; and Santa Clara County with three plants had an output worth $44,541; there were two operating plants each in Kern, Orange, Riverside, San Diego, and San Joaquin counties; and one each in Amador, Butte, Fresno, Humboldt, Marin, Placer, San Bernardino, San Luis Obispo, Tulare, and Ventura counties.

Brick and Hollow Tile Production of California, by Years.

Record of brick production in the State has been kept since 1893 by this Bureau, the figures for hollow building 'tile' or blocks being also included since 1914. The annual and total figures, for amount and value, are given in the following table:

Year	*Brick, M*	*Hollow building blocks, tons*	*Value*
1893	103,900	------	$801,750
1894	81,675	------	457,125
1895	131,772	------	672,360
1896	24,000	------	524,740
1897	97,468	------	563,240
1898	100,102	------	571,362
1899	125,950	------	754,730
1900	137,191	------	905,210
1901	130,766	------	860,488
1902	169,851	------	1,306,215
1903	214,403	------	1,999,546
1904	281,750	------	1,994,740
1905	286,618	------	2,273,786
1906	277,762	------	2,538,848
1907	362,167	------	3,438,951
1908	332,872	------	2,506,495
1909	333,846	------	3,059,929
1910	340,883	------	2,934,731
1911	327,474	------	2,638,121
1912	337,233	------	2,940,290
1913	358,754	------	2,915,350
1914	270,791	------	2,288,227
1915	180,538	------	1,678,756
1916	206,960	------	2,096,570
1917	192,269	29,348	2,532,721
1918	136,374	34,818	2,363,481
1919	156,328	36,026	3,087,067
1920	245,842	99,208	5,704,393
1921	238,022	67,100	5,570,875
1922	374,853	105,909	7,994,991
1923	397,754	122,534	9,738,082
1924	456,716	114,469	9,137,908
1925	361,094	105 491	7,503,976
1926	388,048	90,332	7,026,124
1927	374,111	75,116	6,516,077
1928	272,443	66,277	5,694,770
1929	327,011	66,713	5,607,410
1930	267,019	68,047	4,205,460
1931	151,545	51,988	2,560,415
1932	90,683	27,098	1,605,086
1933	76,905	25,814	1,520,481
1934	66,738	17,534	1,644,661
1935	76,521	21,309	1,855,343
Totals	10,165,002	1,225,131	$134,690,881

CEMENT

Bibliography: State Mineralogist Reports VIII, IX, XII, XIV, XV, XVII, XVIII, XXI–XXVIII (inc.) XXXII. Bulletin 38.

During 1935 there was a production in California of 8,086,292 barrels of cement valued at $10,120,721 f.o.b. plant, of which 2,948.575 barrels came from northern California plants and 5,137,717 barrels

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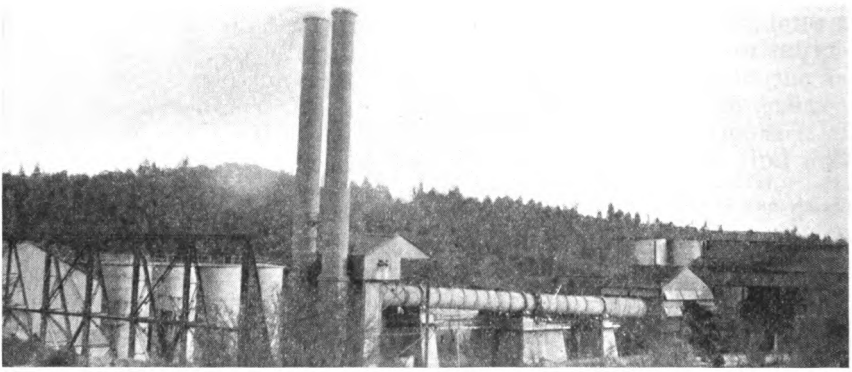

Plant of Calaveras Cement Company near San Andreas, Calaveras County.
Photo by Herbert A. Franke.

from southern California plants. The 1935 output was a decrease from that of 1934, which was 8,936,085 barrels worth $12,445,616.

Shipments during 1935 were made from ten plants in nine counties to the extent of 8,167,595 barrels valued at $11,065,516, as compared with 8,591,951 barrels worth $12,417,337. There were operating during the year, five plants in northern California, one each in Calaveras, Contra Costa, Merced, San Mateo and Santa Cruz counties, which shipped 3,030,105 barrels of cement, and five plants in southern California, two in San Bernardino and one each in Kern, Los Angeles,[1] and Riverside counties, which shipped 5,137,490 barrels. There were 1656 men employed in the above plants in 1935.

Cement Production of California, by Years.

'Portland' cement was first commercially produced in California in 1891; though in 1860 and for several years following, a natural hydraulic cement from Benicia was utilized in building operations in San Francico.

"The Benicia Cement Company in 1859–60 was turning out 50 to 100 barrels of cement a day and San Francisco was using about 12,000 barrels a year. The mill price of the product was then $4 a barrel. By 1865, the San Francisco rate of consumption had increased to 100,000 barrels yearly, brick buildings largely taking the place of frame structures, and the price of cement had fallen to $2.50 a barrel, about the same as it is today."[2]

The growth of the industry became rapid after 1902; since which time cement has continued to be an important factor in the industrial life of the State. Although the total cement figures, to date, are not of the same magnitude as those for gold and petroleum, it is interesting

[1] The plant in Los Angeles County grinds clinker coming from Kern and San Bernardino counties, therefore the crude material is credited to the latter two.
[2] Monthly Review of Mercantile Trust Co. of Calif., Vol. XIII, No. 3, p. 55, Mar. 1924.

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to note that the value of California's cement yield in the period 1920-1931 annually exceeded the value of her gold output.

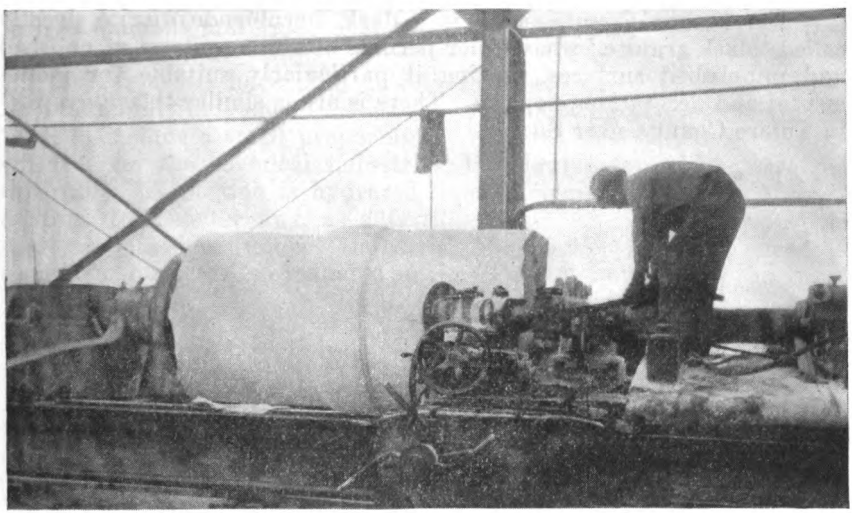
Cement Production of California, by Years

Year	Barrels	Value	Year	Barrels	Value
1891	5,000	$15,000	1915	4,918,275	$6,044,950
1892	5,000	15,000	1916	5,299,507	6,210,293
1893			1917	5,790,734	7,544,282
1894	8,000	21,600	1918	4,772,921	7,969,909
1895	16,383	32,556	1919	4,645,289	8,591,990
1896	9,500	28,250	1920	6,709,160	14,962,945
1897	18,000	66,000	1921	7,404,221	18,072,120
1898	50,000	150,000	1922	8,962,135	16,524,056
1899	60,000	180,000	1923	10,825,405	25,999,203
1900	52,000	121,000	1924	11,655,131	23,225,850
1901	71,800	159,842	1925	13,206,630	25,043,335
1902	171,000	423,600	1926	13,797,173	25,269,678
1903	640,868	968,727	1927	14,661,783	26,474,935
1904	969,538	1,539,807	1928	13,625,231	24,463,287
1905	1,265,553	1,791,916	1929	12,794,729	21,038,565
1906	1,286,000	1,941,250	1930	9,831,938	14,575,731
1907	1,613,563	2,585,577	1931	7,693,712	11,510,655
1908	1,629,615	2,359,692	1932	5,657,549	7,967,107
1909	3,779,205	4,969,437	1933	7,284,031	10,331,395
1910	5,453,193	7,485,715	1934	8,936,085	12,445,616
1911	6,371,369	9,085,625	1935	8,086,292	10,120,721
1912	6,198,634	6,074,661			
1913	6,167,806	7,743,024	Totals	227,509,176	$378,703,040
1914	5,109,218	$6,558,148			

GRANITE

Bibliography: State Mineralogist Reports X, XII-XXVI (inc.), XXVIII, XXXI. Bulletin 38.

The 1935 output of granite in California consisted of 88,306 cu. ft. of building stone valued at $213,093; 26,560 cu. ft. of monumental stone valued at $47,917; 11,300 linear ft. of curbing valued at $7,500, and 338,310 cu. ft. of unclassified material, including a small amount



Turning a section of a granite column at plant of Kingsland Granite Company at Madera, Madera County.

Photo by C. McK. Laizure.

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of tuff and volcanic rock, which was used as building stone and for flagstone, having a value of $71,407; giving a total value for the year's yield at $339,917. This was an increase over the 1934 total value which was $249,083. The 1935 material came from nineteen quarries in twelve counties, four of which were in San Diego County, three in Sonoma County, two each in Fresno and Madera counties, and one each in Lassen, Mariposa, Nevada, Plumas, Placer, Sacramento, Tulare, and Ventura counties. The material from San Luis Obispo, Sonoma, and Ventura counties was tuff.

So far as possible, granite production has been segregated in the statement herewith into the various uses to which the product was put. It will be noted, however, that a portion of the output has been entered under he heading 'Unclassified.' This is necessary because of the fact that some of the producers have no way of telling to what specific use their stone was put after they had quarried and sold the same in the rough.

Varieties.

For building purposes, the granite found in California, particularly the varieties from Raymond in Madera County, Rocklin in Placer County and near Porterville in Tulare County, are unexcelled by any similar stone found elsewhere. The quantities available, notably at Raymond and Porterville, are unlimited. Most of California's 'granite,' particularly that found in the Sierra Nevada Mountains, is technically 'granodiorite' (that is, both plagioclase and orthoclase feldspars are present).

Granites of excellent quality for building and ornamental purposes are also quarried in Riverside and San Diego counties. Near Lakeside, San Diego County, there is a fine-grained, 'silver gray' granite of uniform texture and color, especially suited for monumental and ornamental work.

The Fresno County stone is a dark, hornblende diorite, locally called 'black granite,' whose color permits of a fine contrast of polished and unpolished surfaces, making it particularly suitable for monumental and decorative purposes. There is also a similar 'black granite' in Tulare County, near Success.

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Granite Production of California, by Years.

The value of granite produced, annually, since 1887 has been as follows:

Year	Value	Year	Value
1887	$150,000	1913	$981,277
1888	57,000	1914	628,786
1889	1,329,018	1915	227,928
1890	1,200,000	1916	535,339
1891	1,300,000	1917	221,997
1892	1,000,000	1918	139,861
1893	531,322	1919	220,743
1894	228,816	1920	495,732
1895	224,329	1921	725,901
1896	201,004	1922	676,643
1897	188,024	1923	760,081
1898	147,732	1924	1,211,046
1899	141,070	1925	1,853,859
1900	295,772	1926	655,332
1901	519,285	1927	1,398.443
1902	255,239	1928	763.996
1903	678,670	1929	1,169,271
1904	467,472	1930	855,477
1905	353,837	1931	636,741
1906	344,083	1932	398,676
1907	373,376	1933	183,706
1908	512,923	1934	249,083
1909	376,834	1935	339,917
1910	417,898		
1911	355,742	Total value	$27,342,256
1912	362,975		

LIME

Bibliography: Reports XIV, XV, XVII–XXIX (inc.), Bulletin 38.

In California during 1935 there was an output of lime amounting to 59,731 short tons valued at $573,212 coming from two plants each in El Dorado, San Bernardino, and Santa Cruz counties; and one each in Alameda and Tuolumne counties. The above figures showed an increase in both amount and value over those of 1934 which were 32,500 tons worth $309,765.

So far as we have been able to segregate the data, these figures include mainly only such lime as is used in building operations; though they do include a small proportion of calcined lime employed in agriculture and the chemical industries, the figures for which were not separable. A portion is hydrated lime. Limestone utilized in sugar making, for smelter flux, as a fertilizer, and other special industrial uses, are classified under 'Industrial Materials.' That consumed in cement manufacture is included in the value of cement.

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Lime Production of California, by Years.

The following tabulation gives the amounts and value of lime produced in California by years since 1894 when compilation of such records was begun by the State Mining Bureau. The figures for quantity have been recalculated from 'barrels', as shown in the earlier reports, to 'tons' for the years 1894–1922 (inc.):

Year	Tons	Value	Year	Tons	Value
1894	37,350	$318,700	1916	49,364	$390,475
1895	39,776	386,094	1917	50,073	311,380
1896	30,275	261,505	1918	43,684	461,315
1897	28,780	252,900	1919	42,070	552,043
1898	29,786	254,010	1920	46,314	557,232
1899	29,985	314,575	1921	46,353	610,619
1900	31,252	283,699	1922	57,875	671,747
1901	31,738	334,688	1923	70,894	788,834
1902	44,866	369,616	1924	62,029	703,355
1903	49,659	418,280	1925	61,922	685,528
1904	57,945	571,749	1926	63,568	670,837
1905	61,700	555,322	1927	60,498	631,497
1906	68,927	763,060	1928	56,616	547,919
1907	68,422	756,376	1929	42,834	417,101
1908	39,639	379,243	1930	47,662	452,084
1909	52,075	577,824	1931	36,189	360,523
1910	47,951	477,683	1932	27,510	254,223
1911	42,959	390,988	1933	33,425	271,619
1912	52,212	464,440	1934	32,500	309,765
1913	61,344	528,547	1935	59,731	573,212
1914	43,996	378,663			
1915	35,653	286,304	Totals	1,977,501	$19,545,574

MAGNESITE

Bibliography: State Mineralogist Reports XII–XV (inc.), XVII–XXVII (inc.), XXX, XXXI. Bulletins 38, 79, 91. U. S. Geol. Surv., Bulletins 355, 540. Min. Res. 1913, Pt. II, pp. 450–453. Min. & Sci. Press, Vol. 114, p. 237. "Magnesite"—Hearings before Comm. on Ways and Means, House of Repr., on H. R. 5218, June 16, 17, and July 17, 1919. Eng. Soc. W. Penn., Proc. 1913, Vol. 29, pp. 305–388, 418–444. Eng. & Min. Jour.-Pres., Vol. 114, July 29, and Dec. 2, 1922. U. S. Tariff Comm., "Crude and Caustic Calcined Magnesite. A Preliminary Statement of Information," May 19, 1926.

The production of crude magnesite in California during 1933 came from a single property each in Santa Clara and Stanislaus counties, both being operated by the same company. The annual details are concealed under the 'Unapportioned' item to conceal the output of this single operator. Practically all was shipped in the calcined form.

The output for 1935 showed an increase in both quantity and value over that of 1934. The 1934–1935 production showed a total of 62,509 short tons of crude magnesite valued at $413,228, of which only a small amount was sold as such. Most of this material was calcined. The operators' reports showed that a total of 27,276 short tons of calcined material valued at $659,619 rail shipping point, was made during 1934–1935, and was both dead-burned and periclase for refractories, and material for the plastic trade. From two to two and one-half tons of crude material are required to make one ton of calcined. The average price of crude magnesite reported in 1935 was $6.70 per ton, compared

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with $6.50 per ton in 1934, $5.60 per ton in 1933; $10.00 per ton in 1932; $8.45 per ton in 1931; and $10.04 per ton in 1930.

In California the known deposits are mostly in the metamorphic rocks of the Coast Ranges and the Sierra Nevada, being associated with serpentine areas. The notable exceptions are the sedimentary deposits at Bissell in Kern County and at Afton in San Bernardino County. Several thousand tons have been shipped from the Bissell deposit; and small shipments have been made from the Afton property.

Imports.

The tariff act of 1930 placed the following import duties on magnesite: Crude magnesite 15/32¢ per lb., caustic-calcined magnesite 15/16¢ per lb., dead-burned and grain magnesite, not suitable for manufacture into oxychloride cements, 23/40¢ per lb.; magnesite brick ¾¢ per lb., and 10 per cent ad valorem. The figures of imports for 1935, as published by the U. S. Bureau of Foreign and Domestic Commerce, show a total of 26,166 short tons valued at $466,990, as compared with 24,523 tons worth $404,751 in 1934.

Total Magnesite Production of California.

The first commercial production of magnesite in California was made in the latter part of 1886 from the Cedar Mountain district,[1] southeast of Livermore, Alameda County. Shipments amounting to 'several tons' or 'several carloads' were sent by rail to New York; but there is apparently no exact record of the amount for that first year. The statistical records of the State Mining Bureau began with the year 1887, and the table herewith shows the figures for amount and value, annually, from that time. Shipments of magnesite from Napa County began in 1891 from the Snowflake Mine; from the Red Mountain deposits in Santa Clara County, in 1899; and from Tulare County in 1900.

Total Magnesite Production of California

Year	Tons	Value	Year	Tons	Value
1887	600	$9,000	1913	9,632	$77,056
1888	600	9,000	1914	11,438	114,380
1889	600	9,000	1915	30,271	283,461
1890	600	9,000	1916	154,052	1,311,893
1891	1,500	15,000	1917	209,648	1,976,227
1892	1,500	15,000	1918	83,974	803,492
1893	1,093	10,930	1919	44,696	452,094
1894	1,440	10,240	1920	83,695	1,033,491
1895	2,200	17,000	1921	47,837	511,102
1896	1,500	11,000	1922	55,637	594,665
1897	1,143	13,671	1923	73,963	946,643
1898	1,263	19,075	1924	67,236	900,183
1899	1,280	18,480	1925	64,623	872,944
1900	2,252	19,333	1926	50,915	587,642
1901	4,726	43,057	1927	46,093	577,887
1902	2,830	20,655	1928	45,645	501,590
1903	1,361	20,515	1929	47,269	488,014
1904	2,850	9,298	1930	38,681	388,472
1905	3,933	16,221	1931	21,576	182,283
1906	4,032	40,320	1932	*	
1907	6,405	57,720	1933	40,303	282,325
1908	10,582	80,822	1934		
1909	7,942	62,588	1935	62,509	413,228
1910	16,570	113,887			
1911	8,858	67,430	Totals	1,388,315	$14,122,434
1912	10,512	105,120			

* Combined under "Unapportioned."

[1] See U. S. Geol. Surv.; Mineral Resources of U. S., 1886, pp. 6 and 696.

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MARBLE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVII-XXX (inc.). Bulletin 38. U. S. Bur. of Mines Bull. 106.

The 1935 production of marble in California was valued at $9,884 (including some onyx and travertine from Solano and San Bernardino counties, and a small amount of limestone used as building stone and flagstone coming from an operator in Santa Cruz County). The marble came from a single quarry in Tuolumne County. The 1935 output showed a decrease in value from that of 1934, which was worth $10,759.

California has many beautiful and serviceable varieties of marble, suitable for almost any conceivable purpose of construction or decoration. In the decorative class are deposits of onyx marble of beautiful coloring and effects. There is also serpentine marble suitable for electrical switchboard use.

Marble Production of California, by Years.

Data on annual production since 1887, as compiled by the State Mining Bureau, follows. Previous to 1894 no records of amounts were preserved.

Total Production of Marble in California, by Years

Year	Cubic feet	Value	Year	Cubic feet	Value
1887		$5,000	1912	27,820	$74,120
1888		5,000	1913	41,654	113,282
1889		87,030	1914	25,436	48,832
1890		80,000	1915	22,186	41,518
1891		100,000	1916	25,954	50,280
1892		115,000	1917	24,755	62,950
1893		40,000	1918	[a]17,428	49,898
1894	38,441	98,326	1919	25,020	74,482
1895	14,864	56,566	1920	[b]29,531	92,899
1896	7,889	32,415	1921	30,232	98,395
1897	4,102	7,280	1922	38,321	127,792
1898	8,050	23,594	1923	28,015	124,919
1899	9,682	10,550	1924	[b]61,579	140,253
1900	4,103	5,891	1925	35,664	116,105
1901	2,945	4,630	1926	34,806	119,999
1902	19,305	37,616	1927	[b]42,308	103,689
1903	84,624	97,354	1928	[b]34,324	82,190
1904	55,401	94,208	1929	[b]72,881	93,661
1905	73,303	129,450	1930	[b]65,775	82,194
1906	31,400	75,800	1931	[b]37,776	81,760
1907	37,512	118,066	1932	[b]25,506	42,505
1908	18,653	47,665	1933	[b]9,039	23,178
1909	79,600	238,400	1934	[b]7,185	10,759
1910	18,960	50,200	1935	[b]	9,884
1911	20,201	54,103	Total value		$3,479,688

[a] Includes onyx and serpentine.
[b] Includes onyx and travertine.

ONYX and TRAVERTINE

Bibliography: State Mineralogist Reports XII-XV (inc.), XVII, XVIII, XXI, XXIII, XXXI. Bulletin 38.

Onyx and travertine are known to exist in a number of places in California, but there has been only a small and irregular production since the year 1896. In 1935 there were two producers of onyx and travertine in Solano County. The 1935 output showed an increase in both quantity and value from that of 1934, the figures of which are combined

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with marble. This material is used in terrazzo, auto gear-shift handles, bases for fountain-pen desk sets, and other ornamental purposes.

Onyx Production of California, by Years.

Production by years has been as follows:

Year	Value	Year	Value
1887	*	1923	$2,510
1888	$900	1924	*
1889	900	1925	16,120
1890	900	1926	7,575
1891	1,500	1927	*
1892	2,400	1928	*
1893	1,800	1929	*
1894	27,000	1930	*
1895	20,000	1931	*
1896	12,000	1932	*
1918	24,000	1933	*
1919	*	1934	*
1920		1935	*
1921	1,294		
1922	3,320	Total value	$122,219

* See under Marble.

SANDSTONE

Bibliography: State Mineralogist Reports XII-XV, XVII, XVIII, XXI, XXIII, XXVI-XXVIII (inc.). Bulletin 38. U. S. Bur. of Mines, Bull. 124.

An unlimited amount of high-grade sandstone is available in California, but the wide use of concrete in buildings of every character, as well as the popularity of a lighter-colored building stone, has curtailed production in this branch of the mineral industry during recent years almost to a vanishing point. In 1935 a total of 38,426 cu. ft. of sandstone valued at $9,268, was quarried in California and came from six properties in Los Angeles, Monterey, and San Luis Obispo counties; compared with 21,738 cu. ft. valued at $14,245 for 1934.

Practically all of the material was flagstone which is used in garden walks, fountains, walls and fireplaces to give effect to Spanish and English types of homes. The material reported from Monterey and San Luis Obispo counties is in reality an indurated shale of the Monterey series, of a cream color and utilized as a building stone. Part of the material coming from Los Angeles County was schist and indurated shale.

A large portion of the sandstone was sold for landscape work and used as stepping stones for walks and for fountains, walls, etc.

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Sandstone Production of California, by Years.

Amount and value, so far as contained in the records of this Bureau, are presented herewith, with total value from 1887 to date:

Year	Cubic feet	Value	Year	Cubic feet	Value
1887		$175,000	1912	66,487	$22,574
1888		150,000	1913	62,227	27,870
1889		175,598	1914	111,691	45,322
1890		100,000	1915	63,350	8,438
1891		100,000	1916	17,270	10,271
1892		50,000	1917	31,090	7,074
1893		26,314	1918	900	400
1894		113,592	1919	5,400	3,720
1895		35,373	1920	10,500	2,300
1896		28,379	1921	10,150	2,112
1897		24,086	1922	900	1,100
1898		46,384	1923	7,000	13,000
1899	56,264	103,384	1924	6,700	3,600
1900	378,468	254,140	1925	14,704	14,362
1901	266,741	192,132	1926	34,100	17,500
1902	212,123	142,506	1927	22,900	205,400
1903	353,002	585,309	1928	134,100	43,250
1904	363,487	567,181	1929	177,655	49,881
1905	302,813	483,268	1930	160,704	56,404
1906	182,076	164,068	1931	110,244	30,960
1907	159,573	148,148	1932	41,793	13,286
1908	93,301	55,151	1933	25,980	10,888
1909	79,240	37,032	1934	21,738	14,245
1910	165,971	80,443	1935	38,426	9,268
1911	255,313	127,314			
			Total value		$4,578,027

SERPENTINE

Bibliography: State Mineralogist Report XV. Bulletin 38.

Serpentine has not been produced in California to a very large extent at any time. A single deposit, that on Santa Catalina Island, has yielded the principal output to date. Some material was shipped from there in 1917 and 1918, being the only output recorded since 1907. It was used for decorative building purposes and for electrical switchboards. As there was but a single operator, the figures were combined with those of marble output for those years.

Serpentine Production of California, by Years.

The following table shows the amount and value of serpentine from 1895 as recorded by this bureau:

Serpentine Production in California, by Years

Year	Cubic feet	Value	Year	Cubic feet	Value
1895	4,000	$4,000	1904	200	$2,310
1896	1,500	6,000	1905		
1897	2,500	2,500	1906	847	1,694
1898	750	3,000	1907	1,000	3,000
1899	500	2,000	1917	[a]	[a]
1900	350	2,000	1918	[b]	[b]
1901	89	890	1919		
1902	512	5,065			
1903	99	800	Totals	12,347	$33,259

[a] Under 'Unapportioned.'
[b] See under Marble.

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SLATE

Bibliography: State Mineralogist Reports XV, XVIII, XXIV, XXVIII. Bulletin 38. U. S. Geol. Surv., Bull. 586. U. S. Bur. of Mines, Bull. 218.

Slate was first produced in California in 1889. Up to and including 1910 such production was continuous, but since then it has been irregular. Large deposits of excellent quality are known in the State, especially in El Dorado, Calaveras and Mariposa counties, but the demand has been light owing principally to competition of cheaper roofing materials.

The production of slate in California during the year 1935 was 8066 tons and 40 squares having a total value of $40,912 f.o.b. quarry and came from properties in El Dorado, Inyo, and Tuolumne counties. The 1935 figures showed an increase in both amount and value over those of 1934 which were 5,065 tons worth $24,245. Practically all of the slate was crushed and used for roofing granules. The slate shingles came from an old quarry in El Dorado County.

Total Production of Slate in California.

A complete record of amount and value of slate produced in California follows:

Year	Squares	Value	Year	Squares	Value
1889	4,500	$18,089	1909	6,961	$45,660
1890	4,000	24,000	1910	1,000	8,000
1891	4,000	24,000	1911	----------	----------
1892	3,500	21,000	1915	1,000	5,000
1893	3,000	21,000	1916	----------	----------
1894	1,800	11,700	1920	8	80
1895	1,350	9,450	1921	----------	----------
1896	500	2,500	1922	200	2,400
1897	400	2,800	1923	----------	----------
1898	400	2,800	1926	[a]	7,371
1899	810	5,900	1927	[b]2,686	17,960
1900	3,500	26,250	1928	[b]4,075	31,263
1901	5,100	38,250	1929 [*]	[b]8,220	71,347
1902	4,000	30,000	1930 [*]		
1903	10,000	70,000	1931 [*]	[b]8,234	55,182
1904	6,000	50,000	1932 [*]		
1905	4,000	40,000	1933	[b]5,343	31,958
1906	10,000	100,000	1934	[b]5,065	24,245
1907	7,000	60,000	1935	[a]	40,912
1908	6,000	60,000	Total value	----------	$964,117

[*] Annual details concealed under 'Unapportioned.'
[a] Quantity not shown as both 'squares' and 'tons' included.
[b] Tons.

MISCELLANEOUS STONE

Bibliography: State Mineralogist Reports XII-XXVIII (inc.), XXXI-XXXII. Bulletin 38; also annual statistical bulletins from 1915 to date.

'Miscellaneous stone' is the name used throughout this report as the title for that branch of the mineral industry covering crushed rock of all kinds, paving blocks, sand and gravel, and pebbles for grinding mills. The foregoing are very closely related from the standpoint of the producer; therefore it has been found to be most satisfactory to group these items as has been done in recent reports of this Bureau.

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So far as it has been possible to do so, crushed rock production has been subdivided into the various uses to which the product was put. It will be noted, however, a very large percentage of the output has been tabulated under the heading 'Unclassified.' This is necessary because of the fact that many of the producers have no way of telling to what specific use their rock was put (or at least the proportions to each use) after they have quarried and sold the same to distributors and contractors.

In addition to amounts produced by commercial firms, both corporations and individuals, there is hardly a county in the State but uses more or less gravel and broken rocks on its roads. Of much of this, particularly in the country districts, there is no definite record kept.

During the year 1935 the output of sand and gravel and that of crushed rock showed a decrease in quantity and value from that of 1934. There was a total value of $5,571,041 for 'miscellaneous stone' during 1935, as compared with $7,131,330 for 1934. As in the past Los Angeles County led in the annual output of these products, its 1935 yield being worth $1,135,068, compared with $1,220,639 in 1934; Alameda County was second with an output worth $681,555; Contra Costa County third, with an output worth $274,237; followed in turn by Sacramento, San Bernardino, San Diego, San Benito, Mariposa, Ventura, and Fresno counties.

Paving Blocks.

During 1935 there were no paving blocks reported produced in California.

There was a small output of paving blocks in California during 1934 coming from a single property each in Napa and Sacramento counties. The annual details are concealed under the 'Unapportioned' item so as not to reveal production of either operator.

The paving block industry has decreased materially of recent years, practically to the vanishing point, because of the increased construction of smoother pavements demanded by motor vehicle traffic. The blocks made in Solano County were of basalt; those from Sonoma are of basalt, andesite, and some trachyte, while those from Madera, Placer, Riverside, San Bernardino, and San Diego are of granite; and those from San Mateo County a sandstone.

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The amount and value of paving block production, annually, since 1887 has been as follows:

Year	Amount M	Value	Year	Amount M	Value
1887	*10,000	$350,000	1912	11,018	$578,355
1888	10,500	367,500	1913	6,364	363,505
1889	7,303	297,236	1914	6,053	270,598
1890	7,000	245,000	1915	3,285	171,092
1891	5,000	150,000	1916	1,322	54,362
1892	*3,000	96,000	1917	938	38,567
1893	2,770	96,950	1918	372	17,000
1894	2,517	66,981	1919	27	1,350
1895	2,332	73,338	1920	63	3,155
1896	4,161	77,584	1921	4	280
1897	1,711	35,235	1922	72	3,924
1898	1,144	21,725	1923	15	880
1899	305	7,861	1924	11	935
1900	1,192	23,775	1925	27	1,350
1901	1,920	41,075	1926		
1902	3,502	112,437	1927	41	2,057
1903	4,854	134,642	1928	25	1,658
1904	3,977	161,752	1929		
1905	3,408	134,347	1930		
1906	4,203	173,432	1931	*66	5,900
1907	4,604	199,347	1932		
1908	7,660	334,780	1934	2	75
1909	4,503	199,803	1935		
1910	4,434	198,916			
1911	4,141	210,819	Totals	135,840	$5,325,578

* Figures for 1887–1892 (inc.) are for Sonoma County only, as none are available for other counties during that period though Solano County quarries were then also quite active.

* Annual details concealed under 'Unapportioned.'

Grinding-Mill Pebbles.

The 1935 output of grinding-mill pebbles in California is combined under the 'Unapportioned' item to conceal the production of a single operator each in San Diego and Siskiyou counties.

The amount and value of grinding-mill pebbles, annually, follows:

Year	*Tons*	*Value*
1915	340	$2,810
1916	20,232	107,567
1917	21,450	90,538
1918	8,628	61,268
1919	2,607	19,272
1920	2,104	17,988
1921	247	1,418
1922	1,571	7,628
1923	2,650	14,936
1924	434	2,969
1925	215	1,385
1926	102	612
1927	288	1,800
1928	372	2,408
1929	*	
1930	166	1,225
1931	*	
1932	25	211
1933	*	
1934	300	3,018
1935	*	*
Totals	61,731	$267,053

* Annual details concealed under 'Unapportioned.'

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Sand and Gravel.

A considerable part of the gravel excavated is passed through grading and washing plants, and the material over 2 inches in size is crushed. Much of it is utilized in concrete mixtures. Most of the gravel used for road surfacing and repairs as well as that for railroad ballast is creek-run or pit-run material which is spread upon the roads without undergoing any grading or washing.

The distribution of the 1935 output of sand and gravel by counties is given in the following table:

County	*Tons*	*Value*
Alameda	[a] 1,029,749	$632,548
Amador	11,970	10,867
Butte	44,685	24,791
Contra Costa	[a] 134,042	74,994
Del Norte	45,482	41,788
El Dorado	8,225	15,925
Glenn	61,752	41,285
Humboldt	139,808	39,692
Imperial	17,743	16,945
Kern	68,403	30,522
Lake	7,530	4,975
Lassen	26,512	8,189
Los Angeles	[b] 2,184,230	916,337
Madera	4,225	1,017
Marin	15,600	4,775
Mariposa	11,829	5,779
Mendocino	28,413	10,332
Merced	24,000	14,750
Mono	31,237	33,717
Monterey	90,726	60,689
Napa	10,151	8,690
Nevada	3,495	1,668
Orange	116,024	40,663
Placer	6,338	2,992
Plumas	35,345	13,424
Riverside	[a, b, d] 400,425	158,952
Sacramento	[a] 131,632	96,095
San Bernardino	223,508	143,549
San Diego	[a, b, c] 195,372	169,212
San Joaquin	171,130	86,192
San Luis Obispo	[a] 52,225	22,236
Santa Barbara	17,125	8,081
Santa Clara	96,864	73,301
Santa Cruz	70,052	56,141
Shasta	56,528	38,281
Siskiyou	64,306	26,730
Sonoma	218,800	112,462
Stanislaus	130,034	72,387
Tehama	15,174	5,699
Trinity	6,409	3,803
Tulare	44,189	18,372
Tuolumne	21,930	9,055
Ventura	176,266	105,808
Yolo	78,170	33,950
Yuba	55,291	32,163
Alpine, Calaveras, Colusa, Fresno, Inyo, Kings, Modoc, San Benito, San Mateo, Sierra, Solano--	* 148,888	116,058
	6,531,830	$3,445,881

* Combined to conceal the output of a single operator in each.
[a] Includes molding sand.
[b] Includes blast sand.
[c] Includes roofing granules.
[d] Includes filter sand.

Included in the above is a total of 19,954 tons of molding sand valued at $52,924 coming from two properties in Contra Costa County; and one each in Alameda, Riverside, and Sacramento, San Diego, San Luis Obispo, San Mateo, and Ventura counties. The 1935 yield showed an increase compared with 1934 which was 34,565 tons worth $55,066.

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Crushed Rock.

To list the kinds and varieties of rock utilized commercially under this heading would be to run almost the entire gamut of the classification scale. Much depends on the kind available in a given district. Those which give the most satisfactory service are the basalts and other hard, dense, igneous rocks which break with sharp, clean edges. In many localities, river-wash boulders form an important source of such material. In such cases, combined crushing and washing plants obtain varying amounts of sand and gravel along with the crushed sizes. In Sacramento and Butte counties the tailings piles from the gold dredgers are the basis of like operations.

The values given are based on the selling price, f.o.b. cars, barges, or trucks, at the quarry.

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Crushed Rock Production, by Counties, for 1935

County	Macadam and ballast		Rubble and riprap		Concrete		Unclassified		Totals	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Alameda	*	*	1,000	$1,000	*	*	[a], [b]43,425	$34,950	44,425	$35,950
Alpine	14,565	$8,739							14,425	8,739
Amador	9,118	6,199							9,118	6,199
Butte	*	*			*	*	[a]29,535	16,427	29,535	16,427
Calaveras	1,860	1,250					*	*	1,860	1,250
El Dorado	9,711	14,553			*	*	*	*	9,711	14,553
Fresno	[b]4,800	1,680			*	*	*	*	4,800	1,680
Humboldt	22,030	11,015							22,030	11,015
Inyo	[b]2,468	846					*	*	2,468	846
Kern	17,274	16,500			*	*			17,274	16,500
Lake			133	340			31,968	16,000	32,101	16,340
Los Angeles	*	*	8,697	18,797	*	*	[b]284,470	127,823	293,167	146,620
Madera	29,458	52,448	121	937	218	$469			29,797	53,854
Mariposa	71,623	165,442	1,185	5,705	1,840	1,100	162	240	74,810	172,487
Modoc	[c]28,745	33,448					18,880	9,000	47,625	42,448
Mono			825	4,315					825	4,315
Plumas			4,875	1,630					4,875	1,630
Riverside	7,886	6,946			*	*			7,886	6,946
Sacramento	33,212	43,749	1,785	816	*	*	83,809	93,097	118,806	137,662
San Bernardino	5,045	7,093	16,329	12,099			23,426	36,551	44,800	55,743
San Mateo	54,084	48,361			4,202	5,202	52,500	37,125	110,786	90,688
Santa Clara							53,872	39,742	53,872	39,742
Santa Cruz	*	*			*	*	[b]45,155	13,810	45,155	13,810
Shasta	5,226	11,034			5,940	9,000	[d]31,599	14,535	42,765	34,569
Sierra	19,790	14,995							19,790	14,995
Siskiyou	[c]153,358	39,934							153,358	39,934
Sonoma	6,175	4,458	120	97	12,755	20,255	14,996	9,691	34,046	34,501
Tehama							7,355	5,515	7,355	5,515
Tulare	845	603			1,665	1,733	9,065	6,899	11,575	9,235
Tuolumne	36,750	27,565	1,365	2,730					38,115	30,295
Alameda, Butte, Contra Costa, Imperial, Los Angeles[b], Marin, Napa, Orange[b], San Benito, Santa Cruz, Stanislaus, Ventura*	514,602	400,369							514,602	400,369
Contra Costa, Marin, Napa, Placer, San Diego, Ventura*			34,311	35,153					34,311	35,153
Alameda, Butte, Contra Costa, El Dorado, Fresno, Kern, Los Angeles, Marin, Riverside, Sacramento, San Diego, Santa Cruz, Ventura*					391,439	359,802			391,439	359,802

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Calaveras, Contra Costa, El Dorado, Fresno, Inyo, Lassen, Marin, Mendocino, Monterey, Nevada, San Diego, San Joaquin, Stanislaus, Ventura*							243,399	257,854	243,399	257,854
Totals	1,048,625	$917,820	70,746	$83,619	418,059	$397,561	973,616	$726,160	2,511,046	$2,125,160

* Included under 'Unapportioned.'
[a] Includes granules for roofing and terrazza.
[b] Includes decomposed granite.
[c] Includes volcanic cinder.
[d] Includes slag.

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Miscellaneous Stone Production of California, by Years.

The amount and value, annually, of crushed rock (including macadam, ballast, rubble, riprap, and that for concrete), and sand and gravel, since 1893, follow:

Crushed Rock, Sand and Gravel, by Years

Year	Tons	Value	Year	Tons	Value
1893	371,100	$456,075	1915	10,879,497	$4,609,278
1894	661,900	664,838	1916	9,951,089	4,009,590
1895	1,254,688	1,095,939	1917	8,069,271	3,505,662
1896	960,619	839,884	1918	6,641,144	3,325,889
1897	821,123	600,112	1919	6,919,188	3,678,322
1898	1,177,365	814,477	1920	9,792,122	6,782,414
1899	964,898	786,892	1921	10,914,145	7,834,640
1900	789,287	561,642	1922	13,049,644	10,366,231
1901	530,396	641,037	1923	19,840,301	15,379,838
1902	2,056,015	1,249,529	1924	21,451,129	15,962,476
1903	2,215,625	1,673,591	1925	23,819,137	17,407,113
1904	2,296,898	1,641,877	1926	24,987,606	19,859,261
1905	2,624,257	1,716,770	1927	25,126,691	18,912,994
1906	1,555,372	1,418,406	1928	27,471,794	17,328,044
1907	2,288,888	1,915,015	1929	27,104,618	17,840,159
1908	3,998,945	3,241,774	1930	23,514,168	16,430,027
1909	5,531,561	2,708,326	1931	15,848,313	11,848,531
1910	5,827,828	2,777,690	1932	11,361,564	7,183,643
1911	6,487,223	3,610,357	1933	11,181,156	6,871,581
1912	8,044,937	4,532,598	1934	16,148,275	7,131,330
1913	9,817,616	4,823,056	1935	9,041,876	5,571,041
1914	9,288,397	3,960,973	Totals	382,677,666	$263,568,922

A comparison of the above table of annual production of these materials with the similar table for cement (see *ante*) reveals the fact that the important growth of the crushed rock and gravel business has been coincident with the rapid development of the cement industry from the year 1902.

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INDUSTRIAL MATERIALS

Bibliography: State Mineralogist Reports XII-XXXII (inc.). Bulletin 38. Min. & Sci. Press, Vol. 114, March 10, 1917. Spurr and Wormser, "Marketing of Metals and Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

The following mineral substances have been arbitrarily arranged under the general heading of 'Industrial Materials,' as distinguished from those which have a clearly defined classification, such as metals, salines, structural meterials, etc.

These materials, many of which are mineral earths, are, with four or five exceptions, as yet produced on a comparatively small scale. The possibilities of development along several of these lines are large, and with increasing transportation and other facilities, together with steadily growing demands, the future for this branch of the mineral industry in California is promising. There is scarcely a county in the State but might contribute to the output.

Up to within the last few years, at least, production has been in the majority of instances dependent upon more or less of a strictly local market, and the annual tables show the results of such a condition, not only in the widely varying amounts of a certain material produced from year to year, but in widely varying prices of the same material.

The more important of these minerals thus far exploited, so far as shown by value of the output, are barytes, bentonite (fuller's earth), pottery clay, diatomite, dolomite, gypsum, limestone, mineral water, pumice and volcanic ash, pyrite, silica, and soapstone and talc.

This group, as a whole, showed an increase in total value from $4,276,566 in 1934 to $4,618,588 in 1935.

The following table gives the comparative figures for the amounts and value of industrial minerals produced in California during the years 1934 and 1935.

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Barytes	21,769 tons	$125,514	22,979 tons	$133,810	$8,296+
Bentonite (Fuller's Earth)	6,168 tons	69,325	10,204 tons	68,372	953—
Clay (pottery)	190,510 tons	245,900	240,014 tons	377,969	132,069+
Gems		2,456		948	1,508—
Gypsum	58,149 tons	113,606	70,833 tons	151,807	38,201+
Limestone	198,057 tons	461,139	227,214 tons	496,054	34,915+
Mineral water	19,882,436 gals.	1,071,197	16,659,254 gals.	940,333	130,864—
Pumice and volcanic ash	9,951 tons	54,248	14,890 tons	87,055	32,807+
Silica (glass, sand, quarts)	70,432 tons	296,643	70,835 tons	297,272	629+
Soapstone and talc	13,920 tons	158,606	17,332 tons	170,830	12,224+
Sulphur	4,412 tons	67,656	*	*	—
Unapportioned		[a]1,610,276		[b]1,894,138	283,862+
Total values		$4,276,566		$4,618,588	
Net increase					$342,022+

* Included under 'Unapportioned.'

[a] Includes asbestos, carbon dioxide, diatomite, dolomite, feldspar, fluorspar, pyrite, sillimanite-andalusite-cyanite group, wollastonite.

[b] Includes carbon dioxide, diatomite, dolomite, feldspar, graphite, mica, mineral paint, pyrite, sillimanite-andalusite-cyanite group, sulphur.

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ASBESTOS

Bibliography: State Mineralogist Reports XII-XIX (inc.), XXII, XXVII (inc.), XXIX, XXXI-XXXII. Bulletins 38, 91. Canadian Dept. of M., Mines Branch Bulletin 69. Min. and Sci. Press, April 10, 1920, pp. 531-533. Eng. & Min. Jour.-Press, Vol. 113, pp. 617-625, 670-677. Asbestology, Vol. 5, No. 7, July, 1927.

During 1935 there was no asbestos reported produced in California. In 1934 there was a small output of this material coming from a property in Napa County, and was used in roofing and plaster. The 1934 annual figures are combined under the 'Unapportioned' item to conceal the output of a single operator.

Asbestos Production of California, by Years.

Total amount and value of asbestos production in California since 1887, as given in the records of this Bureau, are as follows:

Year	Tons	Value	Year	Tons	Value
1887	30	$1,800	1912	90	$2,700
1888	30	1,800	1913	47	1,175
1889	30	1,800	1914	51	1,530
1890	71	4,260	1915	143	2,860
1891	66	3,960	1916	145	2,380
1892	30	1,830	1917	136	10,225
1893	50	2,500	1918	229	9,903
1894	50	2,250	1919)*	131	6,240
1895	25	1,000	1920)		
1896			1921	410	19,275
1897			1922	50	1,800
1898	10	200	1923	20	200
1899	30	750	1924	70	4,750
1900	50	1,250	1925)*	25	1,650
1901	110	4,400	1926)		
1902			1927)*	13	1,160
1903			1928)		
1904	10	162	1929)*	219	6,175
1905	112	2,625	1930)		
1906	70	3,500	1931		
1907	70	3,500	1932)*	309	3,274
1908	70	6,100	1934)		
1909	65	6,500	1935		
1910	200	20,000			
1911	125	500	Totals	3,392	$145,984

* Annual details concealed under 'Unapportioned.'

BARITE

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII, XXI-XXVII (inc.). Bulletins 38, 87. Eng. & Min. Jour.-Press, Vol. 114, p. 109, July 15, 1922; Vol. 115, pp. 319-324, Feb. 17, 1923. U. S. Bureau of Mines, Inform. Circ. 6221, 6223.

During 1935 there was a commercial production of barite in California amounting to a total of 22,979 short tons valued at $133,810, f.o.b. railroad-shipping point, as compared with the 1934 output of 21,769 tons worth $125,514.

The 1935 output came from Mariposa, Plumas, and Tulare counties with a single producer in each. This material was consumed in the manufacture of lithopone, in heavy-gravity oil-well drilling-mud, fillers, and barium chemicals.

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The Tariff Act of 1930 placed a duty on foreign imported barite ore, crude or unmanufactured, of $4 per ton; ground or otherwise manufactured, of $7.50 per ton.

Present quotations for barite (93% $BaSo_4$) vary from $6 to $7 (Calif. $7) per ton, crude, f.o.b. rail-shipping point. Most barite has to be washed and acid treated to remove iron stains or other impurities before being suitable for paint use.

Known occurrences of this mineral in California are located in Inyo, Los Angeles, Mariposa, Monterey, Nevada, San Bernardino, Shasta, Santa Barbara and Tulare counties. The deposit at El Portal, in Mariposa County, have given the largest commercial production to date, in part witherite (barium carbonate, $BaCO_3$). Witherite has also been found in Shasta County, but no shipments have yet been made from the deposit.

Total Barite Production of California.

The first recorded production of barite in California, according to the statistical reports of the State Mining Bureau, was in 1910. The annual figures are as follows:

Year	Tons	Value	Year	Tons	Value
1910	860	$5,640	1924		
1911	309	2,207	1925		
1912	564	2,812	1926	4,978	$38,165
1913	1,600	3,680	1927	17,993	90,617
1914	2,000	3,000	1928	13,406	55,888
1915	410	620	1929	26,796	168,829
1916	1,606	5,516	1930	19,783	133,107
1917	4,420	25,633	1931	27,832	156,647
1918	100	1,500	1932	8,507	49,409
1919	1,501	18,065	1933	8,405	49,595
1920	3,029	20,795	1934	21,769	125,514
1921	901	4,809	1935	22,979	133,810
1922	3,370	18,925			
1923	2,925	16,058	Totals	196,043	$1,130,851

BENTONITE (Fuller's Earth)

Bibliography: State Mineralogist Reports XIV, XVII, XVIII, XXI, XXIII, XXV-XXVI (inc.). Bulletins 38, 91. U. S. Bureau of Mines, Bulletin 71. Eng. & Min. Jour.-Press, Vol. 121, pp. 837-842, May 22, 1926.

During 1935 there was produced and shipped in California, 10,204 short tons of bentonite (fuller's earth) valued at $68,372, coming from seven properties—four in San Bernardino County and one each in Inyo, San Benito, and San Diego counties. The 1935 output, as compared with that of 1934, showed an increase in amount with a decrease in value which was 6168 tons, worth $69,325.

Previous to 1931 the Division of Mines classed this material under the heading of 'fuller's earth,' but it was thought advisable to change the name to bentonite, owing to the fact that much bentonite is employed in uses that can not be classed as fuller's earth and therefore has been classified in these reports under pottery clay. This was somewhat confusing. Bentonite is the name commonly applied to the clays of the montmorillonite and halloysite group ('rock soap').

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Fuller's earth includes many kinds of unctuous clays. It is usually soft, friable, earthy, nonplastic, white and gray to dark green in color, and some varieties disintegrate in water. Production has come mainly from Calaveras and Solano counties, with other deposits noted also in Riverside, Fresno, Inyo and Kern counties.

The Tariff Act of June 21, 1930, placed a duty of $1.50 a ton on foreign produced imported fuller's earth.

Bentonite Production of California by Years.

Bentonite including a small amount of fuller's earth was first produced commercially in this State in 1899, and the total amount and value of the output since that time are as follows:

Year	Tons	Value	Year	Tons	Value
1899	620	$12,400	1919	385	$3,810
1900	500	3,750	1920	600	6,000
1901	1,000	19,500	1921	1,185	8,295
1902	987	19,246	1922	6,606	48,756
1903	250	4,750	1923	3,650	55,125
1904	500	9,500	1924	5,290	67,295
1905	1,344	38,000	1925	5,280	91,842
1906	440	10,500	1926	23,552	250,192
1907	100	1,000	1927	13,018	154,764
1908	50	1,000	1928	53,323	501,743
1909	459	7,385	1929	15,541	170,563
1910	340	3,820	1930	12,522	177,964
1911	466	5,294	1931	13,960	222,583
1912	876	6,500	1932	4,295	57,670
1913	460	3,700	1933	4,605	60,621
1914	760	5,928	1934	6.168	69,325
1915	692	4,002	1935	10,204	68,372
1916	110	550			
1917	220	2,180	Totals	173,403	$1,510,169
1918	37	333			

CARBON DIOXIDE GAS

Bibliography: State Mineralogist Report XII.

Carbon dioxide gas was first produced commercially in California in 1894. This material came from a drift on the 575 level of the Santa Isabel shaft of the New Almaden Quicksilver mine at Almaden, Santa Clara County. The drift was bulkheaded and a pipe was placed through the bulkhead for the gas to be drawn off, it then being compressed into cylinders and used in the manufacture of soda water.

In 1933 carbon dioxide gas was again produced, this time from wells drilled near Niland, Imperial County. On November 1, 1934, a dry-ice plant was put into operation for condensation of the carbon dioxide produced from the above wells. The 1935 figures are combined under the 'Unapportioned' item to conceal the output of a single producer.

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Carbon Dioxide Gas Production in California, by Years

Year	M cu. ft.	Value
1894	80	$4,072
1895	800	12,000
1896	81	1,800
1897	---	------
1933 } 1934 } 1935 } *	15,440	1,822
Totals	16,401	$19,194

*Annual details concealed under 'Unapportioned.'

CLAY (Pottery)

Bibliography: State Mineralogist Reports I, IV, IX, XII-XV, XVIII-XXVIII (inc.), XXX-XXXII (inc.). Bulletins 38, 99. Preliminary Report No. 7. U. S. Bureau of Standards, Tech. Paper No. 262.

At one time or another in the history of the State, pottery clay has been mined in thirty-three of its counties. Of these, 17 contributed in 1935. In this report, 'pottery clay' refers to all clays used in the manufacture of red and brown earthenware, china and sanitary ware, flower pots, floor, faience and ornamental tiling, architectural terra cotta, sewer pipe, drain and roof tile, etc., and the figures for amount and value are relative to the crude material at the pit, without reference to whether the clay was sold in the crude form or was immediately used in the manufacture of any of the above finished products by the producer. It does not include clay used in making brick and hollow building blocks.

There are many other important uses for clay besides pottery manufacture. Among these may be enumerated paper, cotton goods, and chemicals. Clays of the montmorillonite and halloysite group ('rock soap') are being utilized successfully in the manufacture of soaps and for filtering oils and as oil-well drilling mud, also as an earth filler in irrigating ditches which run through porous ground.

During 1935 there was a total of 50 properties in 17 counties which reported an output of 240,014 short tons of pottery clay valued at $377,969 f.o.b. rail-shipping point for the crude material, as compared with 51 properties in 17 counties producing 190,510 tons, worth $245,900 in 1934.

Because of the fact that a given product often requires a mixture of several different clays, and that these are not all found in the same pit, it is necessary for most clay-working plants to buy some part of their raw materials from other localities. For these reasons, in compiling the clay industry figures much care is required to avoid duplications. So far as we have been able to segregate the figures, from the data sent in by the operatives, we have credited the clay output to the counties from which the raw material originated; and have deducted tonnages used in brick manufacture, as bricks are classified separately, herein.

A tabulation of the direct returns from the producers, by counties, for the year 1935 is shown herewith:

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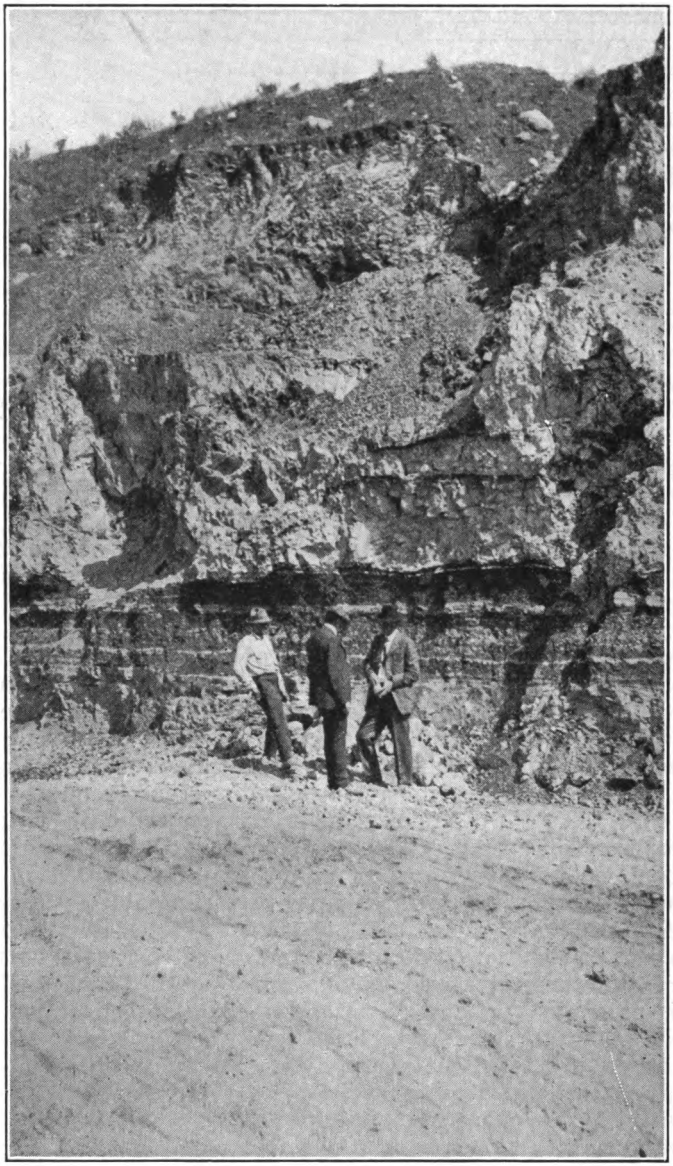

Exposure of lignite coal and clay beds in pit of Alberhill Coal and Clay Company at Alberhill, Riverside County

From State Mineralogist Report XXXI, p. 519.

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POTTERY CLAY IN 1935

County	*Tons*	*Value*	*Used in the manufacture of*
Alameda	3,782	$3,282	Roofing, floor, and mantel tile; chimney, drain, and sewer pipe.
Amador [a]	37,876	66,654	Architectural terra cotta; fire-clay and refractories; chimney; drain and sewer pipe; floor, mantel, and roofing tile; art pottery; electrical porcelain; and various.
Los Angeles	18,118	11,829	Red earthenware; chimney, drain, and sewer pipe; vents; floor, mantel, and roofing tile; art pottery; and various.
Orange	19,276	60,021	Architectural terra cotta; conduits and segment blocks; electrical, porcelain, and chinaware; refractories; vents; drain, floor, and mantel tile; art pottery; and various.
Placer	49,508	76,141	Architectural terra cotta; chimney, drain and sewer pipe; faience; floor, mantel, and roofing tile; red earthenware; electrical porcelain; sanitary ware; and various.
Riverside	54,356	73,809	Conduit, sewer, and drain pipe; red earthenware; faience, floor, mantel, and roofing tile; and various.
San Bernardino [a]	2,623	23,690	Roofing, floor and mantel tile; drain and sewer pipe; red earthenware; refractories; firesand; and various.
Santa Clara	2,778	2,263	Sewer pipe; art pottery; drain, floor, mantel, and roofing tile; stoneware; and various.
Calaveras, Contra Costa, Humboldt, Kern, [b] Sacramento, San Diego, San Luis Obispo, [b] Stanislaus, Ventura *	51,697	60,180	Drain, roofing, and mantel tile; saggers; electrical porcelain; refractories; red earthenware, garden furniture; oil-well drilling-mud; sewer, drain, and conduit pipe; and various.
Totals	240,042	$377,969	

* Combined to conceal the output of single operators in each.
[a] Includes firesand.
[b] Includes clay and shale used for oil-well drilling-mud.

POTTERY CLAY PRODUCTS

The value of the various pottery clay products made in California during 1935 totaled $6,688,117, compared with $4,258,303 in 1934. The distribution for 1935 is shown in the following tabulation:

Product	*Number of Producers*	*Tons*	*Value*
Architectural terra cotta	3	2,244	$244,300
Chimney pipe and flue lining	10	5,095	175,799
Drain pipe	16	3,502	64,239
Roofing tile	20	42,100	430,631
Floor, faience, mantel, and hand made tile	26	------	1,198,581
Sewer pipe	8	35,304	841,523
Red earthenware	6	------	93,958
Stoneware and chemical stoneware	4	------	265,208
Electrical porcelain	5	------	224,665
Conduit pipe	4	2,947	68,472
Fire clay shapes	4	------	58,689
Fire clay and high temperature cement	10	7,390	94,122
Art pottery and chinaware	9	------	834,607
Garden furniture	3	------	110,298
Sanitary ware and plumbing fixtures	4	------	1,279,818
Miscellaneous: chimney accessories, gas-stove radiants, earthenware, porcelain shapes, gas-house tank-blocks, grog, molding clay, segment blocks and liners, vents, sillimanite, brick and shapes, glass-tank blocks, and liners, light aggregate, glazed kitchenware, and crushed rock	16	------	703,207
Total value			$6,688,117

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All the above clay products in 1935 showed an increased total value with the exception of architectural terra cotta and red earthenware over that of the previous year.

Pottery Clay Production of California, by Years.

Amount and value of crude pottery clay output in California since 1887 are given in the following table:

Year	Tons	Value	Year	Tons	Value
1887	75,000	$37,500	1913	231,179	$261,273
1888	75,000	37,500	1914	179,948	167,552
1889	75,000	37,500	1915	157,866	133,724
1890	100,000	50,000	1916	134,636	146,538
1891	100,000	50,000	1917	166,298	154,602
1892	100,000	50,000	1918	112,423	166,788
1893	24,856	67,284	1919	135,708	245,019
1894	28,475	35,073	1920	203,997	440,689
1895	37,660	39,685	1921	225,120	362,172
1896	41,907	62,900	1922	277,232	473,184
1897	24,592	30,290	1923	376,863	697,841
1898	28,947	33,747	1924	417,928	651,857
1899	40,600	42,700	1925	537,587	674,376
1900	59,636	60,956	1926	801,461	806,509
1901	55,679	39,144	1927	867,419	872,661
1902	67,933	74,163	1928	887,807	1,394,950
1903	90,972	99,907	1929	839,949	1,127,527
1904	84,149	81,952	1930	938,586	795,517
1905	133,805	130,146	1931	332,680	408,931
1906	167,267	162,283	1932	167,284	204,890
1907	160,385	254,454	1933	141,629	211,711
1908	208,042	325,147	1934	190,510	245,900
1909	299,424	465,647	1935	240,014	377,969
1910	249,028	324,099			
1911	224,576	252,759	Totals	11,316,662	$14,082,699
1912	199,605	215,683			

DIATOMITE (Diatomaceous Earth)

Bibliography: State Mineralogist Reports II, XII-XV (inc.), XVII-XXVIII (inc.), XXXI, XXXII. Bulletins 38, 67, 91. Am. Inst. Min. Eng., Bull. 104, Aug. 1915, pp.1539-1550. U. S. Bur. of Mines, Rep. of Investigations: Serial No. 2341, Jan. 1923. Eng. & Min. Jour.-Press, Vol. 115, pp. 1152-1154, June 30, 1923.

Diatomite, also known as diatomaceous earth, infusorial earth, tripolite and kieselguhr, is very light (when dry a cubic foot weighs 18 to 20 pounds) and extremely porous, chalk-like material composed of pure silica (chalk, being calcareous) which has been laid down under water and consists of the remains of microscopical infusoria and diatoms. The former are animal remains, and the latter are from plants.

The most important deposits in California thus far known are located in Monterey, Orange, San Luis Obispo, and Santa Barbara counties. The Santa Barbara material is diatomaceous and is of a superior quality, particularly for filtration uses which bring the higher prices. Infusiorial or diatomaceous earths are also found in Fresno, Kern, Los Angeles, Plumas, San Benito, San Bernardino, San Joaquin, Shasta, Sonoma and Tehama coutnies.

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As about 70 per cent of the California output is from a single operator, we have concealed the exact figures under the 'Unapportioned' item in the State and county totals. There were six operators during 1935 in Fresno, Los Angeles, Monterey, Santa Barbara, and Stanislaus counties. The shipments during the year showed in increase in total tonnage and value compared with 1934.

The material shipped was utilized for insulation of both heat and sound, filtration, paint, pigment, cement admixture, fillers, abrasives and for clarification of gasoline and kerosene.

Total Production of Diatomite in California.

The first recorded production of these materials in California occurred in 1889; total amount and value of output, to date, are as follows:

Year	Tons	Value	Year	Tons	Value
1889	39	$1,335	1914	12,840	$80,350
1890			1915	12,400	62,000
1891			1916	15,322	80,649
1892			1917	24,301	127,510
1893	50	2,000	1918	35,963	189,459
1894	51	2,040	1919	40,200	217,800
1895			1920	60,764	1,056,260
1896			1921		
1897	5	200	1922	*90,739	1,016,675
1898			1923		
1899			1924	*193,064	5,729,736
1900			1925		
1901			1926		
1902	422	2,532	1927	* 275,403	1,995,923
1903	2,703	16,015	1928		
1904	6,950	112,282	1929		
1905	3,000	15,000	1930	*300,017	4,848,661
1906	2,430	14,400	1931		
1907	2,531	28,948	1932		
1908	2,950	32,012	1933	*203,228	3,104,154
1909	500	3,500	1934		
1910	1,843	17,617	1935	*	*
1911	2,194	19,670			
1912	4,129	17,074	Totals	1,302,683	$18,827,770
1913	8,645	35,968			

* Annual details concealed under 'Unapportioned.'

DOLOMITE

Bibliography: State Mineralogist Reports XV, XVII, XXVII, XXVIII, XXXI.

The 1935 production came from two properties, one each in Inyo and Monterey counties, the annual details are placed under the 'Unapportioned' item to conceal the output of each operator. The 1935 output showed an increase from that of 1934. The material shipped was utilized for steel-furnace flux and refractories, plaster, stucco, dash-coat, terrazzo, art stone, and for manufacture of CO_2.

Dolomite Production of California, by Years.

Previous to the 1915 statistical report of the State Mining Bureau, dolomite was included under limestone, as the two minerals are closely related chemically; but since dolomite, as such, has been found to have certain distinctive applications, we here give it a separate classification.

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Amount and value of the output of dolomite, annually, have been as follows:

Year	Tons	Value
1915	4,192	$14,504
1916	13,313	46,566
1917	27,911	66,416
1918	24,560	79,441
1919	24,502	67,953
1920	42,388	132,791
1921	31,195	99,155
1922	52,409	114,911
1923	69,519	142,615
1924	28,843	71,271
1925	42,852	104,900
1926	68,640	119,313
1927	45,976	79,442
1928	38,379	85,342
1929	58,644	156,928
1930 1931 *	66,564	161,245
1932	35,275	40,956
1933	54,456	176,575
1934 1935 *	108,645	304,984
Totals	938,263	$2,065,308

* Annual details concealed under 'Unapportioned.'

FELDSPAR

Bibliography: State Mineralogist Reports XV, XVII-XXVIII (inc.), XXX, XXXI. Bulletins 67, 91. U. S. Bureau of Mines, Bulletin 92. Eng. & Min. Jour.-Press, Vol. 115, pp. 535-538, Mar. 24, 1923.

The 1935 feldspar production showed an increase in both amount and value over that of 1934 and is under the 'Unapportioned' item to conceal the output of both operators in San Diego County. The 1933 and 1934 yield amounted to 2655 short tons valued at $30,611.

Total Feldspar Production in California.

Total amount and value of feldspar production in California since the inception of the industry are given in the following table, by years:

Year	Tons	Value	Year	Tons	Value
1910	760	$5,720	1924	9,055	$68,112
1911	740	4,560	1925	8,165	59,615
1912	1,382	6,180	1926	7,300	56,400
1913	2,129	7,850	1927	10,932	86,101
1914	3,530	16,565	1928	14,628	93,745
1915	1,800	9,000	1929	13,327	78,404
1916	2,630	14,350	1930	5,014	35,654
1917	11,792	46,411	1931	4,795	59,921
1918	4,132	22,061	1932	2,294	15,988
1919	1,272	12,965	1933 1934 *	2,655	30,611
1920	4,518	26,189	1935	*	*
1921	4,349	28,343			
1922	4,587	37,109			
1923	11,100	81,800	Totals	133,886	$903,649

* Annual details concealed under 'Unapportioned.'

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FLUORSPAR

Bibliography: State Mineralogist Reports XVII, XVIII, XXIV, XXVI. Bulletins 67, 91. Eng. & Min. Jour.-Press, Vol. 177, pp. 489-492, Mar. 22, 1924.

There were no shipments of fluorspar reported in California during 1935. The 1934 output came from San Bernardino County. The annual details are combined under the 'Unapportioned' item to conceal the output of a single operator. This material was shipped to steel mills to be used as a flux. The combined production of 1933 and 1934 amounted to a total of 227 tons worth $3,631.

Fluorspar, or calcium fluoride, CaF_2, is one of the most important nonmetallic minerals from an industrial standpoint. About 80 per cent of the commercial mineral is prepared in the 'gravel' form and utilized as a flux in the manufacture of steel, for which use no substitute has yet been found.

The California deposits have been reported in Los Angeles, Mono, Riverside and San Bernardino counties. A previous commercial production was made in 1917-1918, when a total of 79 tons valued at $991 was shipped from Riverside County.

Present quotations (Metal and Mineral Markets) are: not less than 85 per cent CaF_2 and not over 5 per cent SiO_2, $16 per ton; No. 2 lamp, $17.50 per ton.

GEMS

Bibliography: State Mineralogist Reports II, XIV, XV, XVII, XVIII, XX, XXI-XXVIII (inc.), XXX, XXXII (inc.). Bulletins 37, 67, 91. U. S. G. S., 'Mineral Resources of the U. S.'; Bull. 603, p. 208. Bull. Dept. Geo. Univ. of Cal., Vol. 5, pp. 149-153, 331-380. Am. Jour. Sci., Vol. 31, p. 31.

The production of gem materials in California has been somewhat irregular and uncertain since 1911. The compilation of complete statistics is difficult owing to widely-scattered places at which stones are gathered and marketed, for the most part in a small way. The gem material reported in California during 1935 had a total value of $945. This output came from Butte, Marin, Monterey, Riverside, San Diego, and Santa Clara counties, and consisted of diamonds, jasper, iceland spar, kunzite, tourmaline, and lepidolite. The above showed a decrease as compared with that of 1934 which was worth $2,456.

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Total Production of Gem Materials in California.

The value of the gem output in California annually since the beginning of commercial production is as follows:

Year	Value	Year	Value
1900	$20,500	1919	$5,425
1901	40,000	1920	36,056
1902	162,100	1921	10,954
1903	110,500	1922	1,312
1904	136,000	1923	13,220
1905	148,500	1924	4,800
1906	497,090	1925	10,663
1907	232,642	1926	9,049
1908	208,950	1927	7,035
1909	193,700	1928	22,200
1910	237,475	1929	26,850
1911	51,824	1930	3,540
1912	23,050	1931	5,607
1913	13,740	1932	4,961
1914	3,970	1933	690
1915	3,565	1934	2,456
1916	4,752	1935	945
1917	3,049		
1918	650	Total	$2,257,820

GRAPHITE

Bibliography: State Mineralogist Reports XIII, XIV, XV, XVII, XXVI (inc.), XXX. Bulletins 67, 91. U. S. G. S., Min. Res., 1914, Pt. II.

Graphite (also called plumbago) has been produced from time to time in the State, coming principally from Sonoma and Los Angeles counties.

Occurrences of graphite have been reported at various times from Calaveras, Fresno, Imperial, Inyo, Los Angeles, Mendocino, San Bernardino, San Diego, Siskiyou, Sonoma and Tuolumne counties. From 1931 to 1933 there was a small production of graphite from a property in Los Angeles County. The annual details are concealed under 'Unapportioned,' owing to their having been but a single operator.

During 1935 there was a small output of graphite coming from a single property in Los Angeles County. This material was used for experimental purposes. The annual details are concealed under the 'Unapportioned' item to conceal the output of the operator. There was no production of graphite during 1934.

Graphite Production of California, by Years.

According to the records of the State Mining Bureau, the graphite production of California, by years, has been as follows:

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Year	Pounds	Value
1901	128,000	$4,480
1902	84,000	1,680
1903		
1913	2,500	25
1914		
1915		
1916	29,190	2,335
1917		
1918	*770,000	37,225
1919		
1920		
1921	*624,000	26,160
1922		
1923		
1925		
1926	*76,000	13,120
1927		
1928		
1931		
1932	156,000	1,950
1933		
1934		
1935	*	*
Totals	2,269,690	$86,975

* Annual details concealed under 'Unapportioned,' on account of a single producer.

GYPSUM

Bibliography: State Mineralogist Reports XIV, XV, XVII, XVIII, XXII, XXIII, XXV-XXVIII (inc.), XXX, XXXI. Bulletins 38, 67, 91. U. S. Geol. Surv., Bull. 223, 413, 430, 697. U. S. Bur. of Standards, Circular No. 281.

During the year 1935 there were shipments of gypsum in California amounting to 70,833 short tons valued at $151,807, coming from three properties in Fresno County, one in Imperial County, and one in Riverside County. This was an increase in both quantity and value over the 1934 output, which was 58,149 tons worth $113,606.

Total Production of Gypsum in California.

Production of gypsum annually in California since such records have been compiled by this Bureau is as follows:

Year	Tons	Value	Year	Tons	Value
1887	2,700	$27,000	1913	47,100	$135,050
1888	2,500	25,000	1914	29,734	78,375
1889	3,000	30,000	1915	20,200	48,953
1890	3,000	30,000	1916	33,384	59,533
1891	2,000	20,000	1917	30,825	56,840
1892	2,000	20,000	1918	19,695	37,176
1893	1,620	14,280	1919	19,813	50,579
1894	2,446	24,584	1920	20,507	92,535
1895	5,158	51,014	1921	37,412	78,575
1896	1,310	12,580	1922	47,084	188,336
1897	2,200	19,250	1923	86,410	289,136
1898	3,100	23,600	1924	25,569	53,210
1899	3,663	14,950	1925	107,613	172,444
1900	2,522	10,088	1926	114,868	211,337
1901	3,875	38,750	1927	94,630	292,090
1902	10,200	53,500	1928	104,790	200,567
1903	6,914	46,441	1929	140,844	396,951
1904	8,350	56,592	1930	116,865	243,507
1905	12,859	54,500	1931	88,354	199,198
1906	21,000	69,000	1932	46,867	93,818
1907	8,900	57,700	1933	59,235	120,451
1908	34,600	155,400	1934	58,149	113,606
1909	30,700	138,176	1935	70,833	151,807
1910	45,294	129,152			
1911	31,457	101,475	Totals	1,709,667	$4,704,794
1912	37,529	117,388			

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LIMESTONE

Bibliography: State Mineralogist Reports IV, XII-XV (inc.), XVII-XXXI (inc.). Bulletins 38, 91. Oregon Agr. College Extension Bulletin 305. Eng. and Min. Jour.-Press, Vol. 120, pp. 249-253.

'Industrial' limestone was produced on 17 properties in ten counties in California during 1935 to the amount of 227,214 short tons valued at $496,054, being an increase in both amount and value over that of 1934 which was 198,057 tons worth $481,139. The 1935 yield came from four operators in El Dorado County; three in Santa Clara County; two each in San Bernardino, Santa Cruz, and Tuolumne counties; and one each in Alameda, Fresno, San Luis Obispo, and San Mateo counties.

The amount here given does not include the limestone used in the manufacture of cement nor for macadam and concrete, nor of lime for building purposes; but accounts for that utilized as a smelter and foundry flux, for glass and sugar making, and other special chemical and manufacturing processes. It also includes that utilized for fertilizers (agricultural 'lime'), 'roofing gravel,' paint and concrete filler, whiting for paint, putty, kalsomine, terrazzo, paving dust, chicken grit, carbon dioxide gas, 'paving compound,' facing dust for concrete pipe, also for rubber and magnesite mix. The material from Fresno County was marl; and that from Alameda, San Mateo and Santa Clara counties was shells, dredged from San Francisco Bay, which was ground and used for agricultural purposes and poultry grit. Of the total 'industrial' limestone produced in 1935 approximately $35,933 tons valued at $128,233, were used for agricultural purposes and poultry grit.

Distribution of the 1935 output of limestone was as follows:

County	*Tons*	*Value*
El Dorado	151,814	$298,867
Santa Clara [b]	30,613	71,381
Alameda,[b] Fresno,[a] San Bernardino, San Luis Obispo, San Mateo,[b] Santa Cruz, Tuolumne *	44,787	125,806
Totals	227,214	$496,054

* Combined to conceal the output of individual operators in each.
[a] Includes marl.
[b] Includes shells.

Limestone Production of California, by Years.

The following tabulation gives the amounts and value of 'industrial' limestone produced in California by years since 1894 when compilation of such records was begun by the State Mining Bureau. These tonnages consist principally of limestone utilized for flux, glass and sugar making, agricultural, chemical, and other special industrial purposes. That utilized in cement manufacture is not included:

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Year	Tons	Value	Year	Tons	Value
1894	15,420	$19,275	1916	187,521	$217,733
1895	71,355	71,690	1917	237,279	356,396
1896	68,184	71,112	1918	208,566	456,258
1897	36,796	38,556	1919	88,291	248,145
1898	27,686	24,548	1920	90,120	298,197
1899	30,769	29,185	1921	75,921	305,912
1900	32,791	31,532	1922	84,382	282,181
1901	76,937	99,445	1923	143,266	348,464
1902	71,422	90,524	1924	219,476	582,660
1903	125,919	163,988	1925	319,977	494,525
1904	40,207	87,207	1926	108,795	367,501
1905	192,749	323,325	1927	699 790	663,957
1906	80,262	162,827	1928	127,895	397,935
1907	230,985	406,041	1929	168,315	557,617
1908	273,890	297,264	1930	169,477	508,751
1909	337,676	419,921	1931	177,268	560,699
1910	684,635	581,208	1932	168,950	487,788
1911	516,398	452,790	1933	207,371	487,712
1912	613,375	570,248	1934	198,057	461,139
1913	301,918	274,455	1935	227,214	496,054
1914	572,272	517,713			
1915	146,324	156,288	Totals	8,454,901	$13,457,766

LITHIA

Bibliography: State Mineralogist Reports II, IV, XIV, XXI, XXX. Bulletins 38, 67, 91.

Lithia mica, lepidolite (a silicate of lithium and others), utilized in the manufacture of artificial mineral water, fireworks, glass, etc., has been mined in San Diego County since 1899, except between 1905 and 1915, though there was none shipped in 1923, 1925, 1929-1935 (inc.). During 1930 there was a small amount of lepidolite mined in California, but none shipped. Some amblygonite, a lithium phosphate, is occasionally also obtained from pockets associated with the gem tourmalines.

Lithia mica total production in the State has been as follows:

Year	Tons	Value	Year	Tons	Value
1899	124	$4,600	1920	10,046	$153,502
1900	440	11,000	1921	*1,365	20,781
1901	1,100	27,500	1922		
1902	822	31,880	1923		
1903	700	27,300	1924	109	2,269
1904	641	25,000	1925		
1905	25	276	1926		
1906			1927	*550	13,900
1915	91	1,365	1928		
1916	71	1,065	1929		
1917	880	8,800			
1918	4,111	73,998	Totals	21,875	$417,636
1919	800	14,400			

* Annual details concealed under 'Unapportioned.'

MICA

Bibliography: State Mineralogist Reports II, IV, XXVI-XXVIII (inc.), XXX. Bulletins 38, 67, 91. U. S. Geol. Surv., Bull. 740; Min. Res. of U. S. Eng. & Min. Jour.-Press, Vol. 115, pp. 55-60, Jan. 13, 1923.

Sericite, a fine-grained variety of muscovite, has been produced continuously since 1929 in California, though there was no production of mica during 1934. The 1935 output came from a single property in Imperial County. The annual details are concealed in the 'Unappor-

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tioned' item so as not to reveal production of the operator. This type of material is used as a cheap grade of ground mica for roofing as a refractory, foundry facing, and decorative material to imitate snow.

Production of mica in California has been as follows:

Year	Tons	Value
1902	50	$2,500
1903	50	3,800
1904	50	3,000
1929, 1930, 1931*	2,240	15,260
1932, 1933*	1,957	13,963
1934	----	------
1935	*	*
Totals	4,347	$38,523

* Annual details concealed under 'Unapportioned."

MINERAL PAINT

Bibliography: State Mineralogist Reports XII-XIX (inc.), XXI, XXII-XXVIII (inc.). Bulletins 38, 91.

During 1935 there was a small amount of mineral paint produced in California, which came from a single property in Placer County. The details are concealed under 'Unapportioned' so as not to reveal individual output. There was no production in 1934.

These materials have come from Alameda, Amador, Butte, Calaveras, Colusa, Los Angeles, Napa, Nevada, Placer, Riverside, Shasta, Sonoma, Stanislaus and Ventura counties. There are also other deposits that may have possible commercial value, but as yet there have been no commercial shipments from El Dorado, Imperial, Kern, Kings, Lake, Mendocino, San Diego, Siskiyou, Trinity and Yuba counties, in which they are found.

Mineral Paint Production of California, by Years.

The first recorded production of mineral paint materials in the State was in the year 1890. The output, showing annual amount and value since that time, is given herewith:

Year	Tons	Value	Year	Tons	Value
1890	40	$480	1914	132	$847
1891	22	880	1915	311	1,756
1892	25	750	1916	643	3,960
1893	590	26,795	1917	520	2,700
1894	610	14,140	1918	728	4,738
1895	750	8,425	1919	1,780	17,055
1896	395	5,540	1920	779	8,477
1897	578	8,165	1921	446	4,748
1898	653	9,698	1922	1,620	13,277
1899	1,704	20,294	1923	1,049	11,773
1900	529	3,993	1924	532	5,234
1901	325	875	1925	669	6,969
1902	589	1,533	1926	569	5,846
1903	2,370	3,720	1927*	919	9,592
1904	270	1,985	1928		
1905	754	4,025	1929	467	2,820
1906	250	1,720	1930*	250	3,000
1907	250	1,720	1931		
1908	335	2,250	1932	----	----
1909	305	2,325	1933	*	*
1910	200	2,040	1934	----	----
1911	186	1,184	1935	*	*
1912	300	1,800			
1913	303	1,780	Totals	23,147	$222,098

* Annual details concealed under 'Unapportioned.'

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MINERAL WATER

Bibliography: State Mineralogist Reports VI, XII-XVIII (inc.), XXI-XXIX (inc.), XXXI, XXXII. U. S. G. S., Water Supply Paper 338. Min. Res., 1914, 1916. 'Mineral Springs and Health Resorts of California,' by Dr. Winslow Anderson, 1890. U. S. Dept. of Agr., Bur. of Chem., Bulletin 91.

A widespread production of mineral water is shown annually in California. These figures refer to mineral water actually bottled for sale, or for local consumption. Water from some of the springs having a special medicinal value brings a price many times higher than the average shown, while in some cases the water is used merely for drinking purposes and sells for a nominal figure. Health and pleasure resorts are located at many of the springs. The waters of some of the hot springs are not suitable for drinking, but are very efficacious for bathing. From a therapeutic standpoint, California is particularly rich in mineral springs.

The commercial production of mineral water during 1935 amounted to 16,659,254 gallons valued at $940,333, as compared with 19,882,436 gallons worth $1,071,197 in 1934. The 1935 output came from springs on 36 properties in 17 counties and was distributed as follows:

County	*Gallons*	*Value*
Lake	22,410	$13,909
Los Angeles	7,379,521	647,416
Napa	38,000	3,650
Sonoma	24,747	4,295
Butte, Calaveras, Contra Costa, El Dorado, Marin, Orange, Riverside, San Bernardino, San Diego, San Francisco, San Luis Obispo, Santa Barbara, Siskiyou *	9,214,849	271,063
Totals	16,659,254	$940,333

* Combined to conceal the output of operators in each.

The production above tabulated either came from springs or artesian wells, and was bottled, in part with artificial carbonation, but mostly natural, and sold for drinking purposes. A large part was used in the preparation of soft drinks with flavors.

Mineral Water Production of California, by Years.

Mineral water was bottled for sale, at the Napa Soda Springs, Napa County, as early as 1856,[1] and at other springs in California, notably The Geysers, Sonoma County, also at early dates; but there are no figures available earlier than the year 1887. Amounts and values, annually, since that year are shown herewith:

[1] Cronise, T. F., The natural wealth of California, p. 182, 1868.

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Year	Gallons	Value	Year	Gallons	Value
1887	618,162	$144,368	1913	2,350,792	$599,748
1888	1,112,202	252,990	1914	2,443,572	476,169
1889	808,625	252,241	1915	2,274,267	467,738
1890	258,722	89,786	1916	2,273,817	410,112
1891	334,553	139,959	1917	1,942,020	340,566
1892	331,875	162,019	1918	1,808,791	375,650
1893	383,179	90,667	1919	2,233,842	340,117
1894	402,275	184,481	1920	2,391,791	421,643
1895	701,397	291,500	1921	3,446,278	367,476
1896	808,843	337,434	1922	4,276,346	486,424
1897	1,508,192	345,863	1923	5,487,276	616,919
1898	1,429,809	213,817	1924	8,159,211	818,726
1899	1,338,537	406,691	1925	12,115,072	1,230,455
1900	2,456,115	268,607	1926	14,074,877	1,171,550
1901	1,555,328	559,057	1927	16 644,423	1,487.183
1902	1,701,142	612,477	1928	25,049 002	1,304,989
1903	2,056,340	558,201	1929	27.032,083	2,040,615
1904	2,430,320	496,946	1930	37.354,111	2,870,663
1905	2,194,150	538,700	1931	26,164,331	1,347,860
1906	1,585,690	478,186	1932	19,031,224	1,495,988
1907	2,924,269	544,016	1933	15,650,406	719,746
1908	2,789,715	560,507	1934	19,882,436	1,071,197
1909	2,449,834	465,488	1935	16,659,254	940,333
1910	2,335,259	522,009			
1911	2,637,669	590,654	Totals	308,395,218	$31,127,894
1912	2,497,794	529,384			

PHOSPHATES

Bibliography: State Mineralogist Report XXI. Bulletins 67, 91.

No commercial production of phosphates has been recorded from California, though occasional pockets of the lithium phosphate, amblygonite, Li (AlF) PO_4, have been found associated with the gem tourmaline deposits in San Diego County. Such production has been classified under lithia.

PUMICE and VOLCANIC ASH

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII, XVIII, XXII-XXVIII (inc.), XXX-XXXII (inc.). Bulletin 38. U. S. Bureau of Mines I. C. 6560. (See 'Tufa.')

The production of pumice and volcanic ash in California during the year 1935 amounted to 14,890 short tons valued at $87,055, coming from three properties in Inyo County and one each in Imperial, Kern, Madera, Mono, Napa, San Luis Obispo, and Siskiyou counties. The 1935 output showed an increase in quantity and value over that of 1934, which was 9,951 tons worth $54,248.

The material from two of the deposits in Inyo County and from Imperial, Mono, Napa, and Siskiyou counties was 4,492 tons of pumice; this was used in acoustic plaster, light-weight aggregate in concrete, for abrasive purposes, and for chicken-house litter. The product from one property in Inyo and those from Kern, Madera and San Luis Obispo counties was 10,398 tons of volcanic ash or tuff variety and was employed in making soap, cleanser compounds, a large tonnage being utilized as a concrete filler in cement displacement, and in asphalt and as a carrier for dry agricultural sprays. The Kern County

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ash is going into the preparation of one of our popular and nationally advertised brands of cleanser compounds.

Pumice Production of California, by Years.

Commercial production of pumice in California was first reported to the State Mining Bureau in 1909, then not again until 1912, since which year there has been a small annual output, as indicated by the following table:

Year	Tons	Value	Year	Tons	Value
1909	50	$500	1924	4,919	$33,404
1910	----------	----------	1925	5,319	32,937
1911	----------	----------	1926	7,170	48,350
1912	100	2,500	1927	13,779	168,896
1913	3,590	4,500	1928	10,440	105,055
1914	50	1,000	1929	10,449	76,123
1915	380	6,400	1930	12,947	128,847
1916	1,246	18,092	1931	11,711	108,130
1917	525	5,295	1932	9,891	86,034
1918	2,114	28,669	1933	8,243	61,067
1919	2,388	43,657	1934	9,951	54,748
1920	1,537	25,890	1935	14,890	87,055
1921	406	6,310			
1922	613	4,248	Totals	135,644	$91,154,016
1923	2,936	16,309			

PYRITES

Bibliography: State Mineralogist Reports XVIII, XIX, XXII, XXV, XXVI, XXX. Bulletins 38, 91. Min. and Sci. Press, Vol. 144, pp. 825, 840.

Pyrite shipped in California during 1935 came from a single property in Shasta County, while that for 1934 came from two properties, one each in Alameda and Shasta counties. The 1935 production showed an increase in both quantity and value over that of 1934. The annual details are placed under 'Unapportioned' to conceal the output of individual operators.

This material was mostly used in the manufacture of sulphuric acid for explosives and fertilizer. Some iron sulphate had been produced previously and was utilized directly in the preparation of an agricultural fertilizer and insecticide. The sulphur content ranged up to 50.8% S.

This does not include the large quantities of pyrite, chalcopyrite, and other sulphides which are otherwise treated for their valuable metal contents. Some sulphuric acid is annually made as a by-product in the course of roasting certain tonnages of Mother Lode auriferous concentrates while under treatment for their precious metal values.

Pyrites Production in Cailfornia, by Years.

The total recorded pyrites production in California to date is as follows:

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Year	Tons	Value	Year	Tons	Value
1898	6,000	$30,000	1918	128,329	$425,012
1899	5,400	28,620	1919	147,024	540,300
1900	3,642	21,133	1920	146,001	530,581
1901	4,578	18,429	1921	110,025	473,735
1902	17,525	60,306	1922	151,381	570,425
1903	24,311	94,000	1923	148,004	555,308
1904	15,043	62,992	1924	124,214	517,835
1905	15,503	63,958	1925	129,500	528,550
1906	46,689	145,895	1926	100,896	466,068
1907	82,270	251,774	1927	130,910	564,823
1908	107,081	610,335	1928	90,566	400,627
1909	457,867	1,389,802	1929	79,169	363,717
1910	42,621	179,862	1930	39,958	194,228
1911	54,225	182,954	1931	25,402	131,174
1912	69,872	203,470	1932*	72,271	297,832
1913	79,000	218,537	1933*		
1914	79,267	230,058	1934*	157,129	547,754
1915	92 462	293,148	1935*		
1916	120,525	372,969			
1917	111,325	323,704	Totals	3,214,985	$11,889,985

* Annual details concealed under 'Unapportioned'.

SHALE OIL

Bibliography: State Mineralogist Report XIX. U. S. Geol. Surv., Bulletins 322, 729. U. S. Bur. of Mines, Bull. 210. Eng. and Min. Jour.-Press, Vol. 118, No. 8, pp. 290-292, Aug. 23, 1924. Chem. & Met. Eng., Vol. 32, No. 6, Feb., 1925. Min. Congress Jour., Dec., 1924.

Two plants on a more or less experimental scale operated for six years in California, with commercial production beginning in a small way in 1922. The product, in part, was sold for utilization as a flotation oil in metallurgical work, and part consumed as fuel at the plants. There was no production reported for 1935.

Shale Oil Production of California, by Years

Year	*Barrels*	*Value*
1922*		
1923*	4,333	$44,262
1924*		
1925*	8,688	55,240
1926*		
1927*	8,819	9,998
1928	----	----
Totals	21,840	$109,500

* Annual details concealed under 'Unapportioned.'

SILICA (Sand and Quartz)

Bibliography: State Mineralogist Reports IX, XIV, XV, XVII, XVIII, XX-XXVIII (inc.), XXXI, XXXII. Bulletins 38, 67, 91.

We combine these materials because of the overlapping roles of vein quartz which is mined for use in glass making and as an abrasive, and that of silica sand which, although mainly utilized in glass manufacture, also serves as an abrasive. Both varieties are also utilized to some extent in fire-brick manufacture.

We do not include under this heading such forms of silica as: quartzite, sandstone, flint, tripoli, diatomaceous earth, nor the gem forms of 'rock crystal,' amethyst, and opal. Each of these has various industrial uses, which are treated under their own designations.

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The production of silica in California during the year 1935 amounted to 70,835 short tons valued at $297,272 f.o.b. rail-shipping point and came from two properties each in Contra Costa and San Diego counties and one each in El Dorado, Orange, Placer, and Riverside. The above was an increase in both amount and value as compared with the 1934 output of 70,432 tons worth $296,643. The 1935 output consisted of 69,756 tons of glass sand and 1,079 tons of vein or boulder quartz. In addition to the above output for 1935 there were several thousand tons of quartzite shipped from San Bernardino County to be used in the manufacture of silica brick. To avoid duplication, its amount and value is not added to the silica totals.

The glass sand came from Contra Costa, Orange and Riverside counties. For making the higher grades of glass, deposits in Contra Costa County are replacing the sand imported from Belgium. Belgium sand has displaced local material in the manufacture of sodium silicate ('water glass'). There are various deposits of quartz in California which could be utilized for glass making, but to date they have not been so used owing to the cost of grinding and the difficulty of preventing contamination by iron while grinding.

Silica sand has been produced in the following counties of the State: Alameda, Amador, Contra Costa, El Dorado, Imperial, Inyo, Los Angeles, Mariposa, Mono, Monterey, Orange, Placer, Riverside, San Diego, San Joaquin and Tulare, the chief centers being Contra Costa, Amador, Monterey and Los Angeles counties. The industry is of limited importance, so far, because of the fact that much of the available material is not of a grade which will produce first-class colorless glass; for such, it must be essentially iron-free. Even a fractional per cent of iron imparts a green color to the glass.

The Tariff Act of June 21, 1930, placed a duty on sand, containing 95 per cent or more of *Silica* and not more than six-tenths of 1 per cent of oxide of iron and suitable for use in the manufacture of glass, of $2 per ton.

Total Silica Production in California.

Total silica production in California since the inception of the industry, in 1899, is shown below, being mainly sand:

Year	Tons	Value	Year	Tons	Value
1899	3,000	$3,500	1919	18,659	$101,600
1900	2,200	2,200	1920	25,324	96,793
1901	5,000	16,250	1921	10,569	49,179
1902	4,500	12,225	1922	9,874	31,016
1903	7,725	7,525	1923	7,964	30,420
1904	10,004	12,276	1924	6,808	35,006
1905	9,257	8,121	1925	12,498	96,780
1906	9,750	13,375	1926	30,010	104,317
1907	11,065	8,178	1927	24,636	94,762
1908	9,255	22,045	1928	14,814	66,679
1909	12,259	25,517	1929	18,686	79,210
1910	19,224	18,265	1930	17,802	71,380
1911	8,620	8,672	1931	43,330	182,769
1912	13,075	15,404	1932	33 997	136,324
1913	18,618	21,899	1933	70,329	266,520
1914	28,538	22,688	1934	70,432	296,643
1915	28,904	34,322	1935	70,835	297,272
1916	20,880	48,908			
1917	19,376	41,166	Totals	751,074	$2,457,136
1918	23,257	$88,930			

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SILLIMANITE-ANDALUSITE-KYANITE GROUP

Bibliography: State Mineralogist Reports XX, XXIII, XXIV, XXVII. Bulletins 67, 91. Dana's Mineralogy. U. S. Geol. Surv., Prof. Paper 110. U. S. Bureau of Mines, Inform. Circ. 6255. Eng. & Min. Jour.-Press, Vol. 120, pp. 91-94, 1925. Amer. Mineralogist, June, 1924.

Sillimanite and andalusite are both aluminum silicates (Al_2SiO_5), having the same composition and formula, but with slightly different physical characteristics. Though both crystallize in the orthorhombic system, their crystal habits are different. A massive deposit of andalusite, found in Dry Creek Canyon in the White Mountains of the Inyo Range, in Mono County, is being mined by the Champion Spark Plug Company of Detroit, Michigan. The material is shipped East and utilized in the manufacture of porcelain for automobile spark plugs, for other high-tension electric insulators, laboratory ware and porcelain. Porcelain made from these minerals can be subjected to sudden and extreme changes in temperature without damage.

Kyanite is also an aluminum silicate (Al_2SiO_5), of the same chemical composition as andalusite and sillimanite, but crystallizing in the triclinic system. A deposit of cyanite is being mined in Imperial County, near Ogilby, by the Vitrefrax Corporation and shipments made to their refractory plant in Los Anegles.

Dumortierite, though different somewhat in composition from the above, being a basic aluminum silicate ($HAl_6BSi_3O_{20}$), has proved similar in behavior in ceramic work so that it is now being mixed with andalusite for electrical porcelains. A deposit of this mineral in Nevada is being mined for that purpose. Occurrences of massive dumortierite are known in Imperial and San Diego counties in this State and there may yet be some commercial possibilities for them.

Total Sillimanite Group Production of California, by Years

Year	*Tons*	*Value*
1922 1923 * 1924	4,584	$98,790
1925 1926 *	4,810	203,000
1927 1928 *	4,276	76,000
1929 1930 *	4,359	198,893
1931 1932 *	1,244	21,800
1933 1934 *	3,035	69,026
1935	*	*
Totals	22,308	$667,509

* Annual details concealed under 'Unapportioned.'

SOAPSTONE and TALC

Bibliography: State Mineralogist Reports XII, XIV, XV, XVII-XXVII (inc.), XXX. Bulletins 38, 67, 91. U. S. Bur. of Mines, Bulletin 213. Rep. of Investigations, Serial No. 2253, May, 1921.

The total output of talc and soapstone in California during 1935 amounted to 17,332 short tons valued at $170,830. The 1935 figures

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showed an increase in both amount and value over those of 1934, which were 13,920 tons and $158,606. Of the 1935 production 16,541 tons were high-grade talc from Inyo and San Bernardino counties; this material was utilized mainly in toilet powder, paint, paper and rubber manufacture, and in ceramics. The remainder of 791 tons was soapstone and came from Butte and El Dorado counties.

The 'soapstone' grades were used mainly for roofing granules and as a filler in roofing paper, and part also in magnesite cement.

It is reported that California talc has replaced to some extent imported talc in the toilet trade on the basis of quality. The largest production of talc in the United States comes from Vermont and New York, and of massive soapstone from Virginia.

During 1935 imports of talc, steatite, etc., into the United States totaled 23,897 short tons valued at $492,274, as compared with 22,921 tons worth $368,014 during 1934, according to the United States Bureau of Foreign and Domestic Commerce.

The Tariff Act of 1930 places a duty on talc, steatite or soapstone and French chalk, crude or unground, of one-fourth of one cent per pound.

Talc Production of California, by Years.

Production was intermittent in the State up to 1912; but there has been a material growth since 1916, as shown in the following table:

Year	Tons	Value	Year	Tons	Value
1893	400	$17,750	1916	1,703	$9,831
1894	----------	----------	1917	5,267	48,279
1895	25	375	1918	11,760	85,534
1896	----------	----------	1919	8,764	115,091
1897	----------	----------	1920	11,327	221,362
1898	----------	----------	1921	8,752	130,078
1899	----------	----------	1922	13,378	197,186
1900	----------	----------	1923	17,439	252,661
1901	10	119	1924	16,179	242,770
1902	14	288	1925	15,465	239,084
1903	219	10,124	1926	17,004	255,645
1904	228	2,315	1927	16,218	164,744
1905	300	3,000	1928	18,668	251,372
1906	----------	----------	1929	18,676	193,493
1907	----------	----------	1930	15,861	154,258
1908	3	48	1931	13,472	109,940
1909	33	280	1932	10,690	122,880
1910	740	7,260	1933	14,451	153,668
1911	----------	----------	1934	13,920	158,606
1912	1,750	7,350	1935	17,332	170,830
1913	1,350	6,150			
1914	1,000	4,500	Totals	274,061	$3,348,621
1915	1,663	14,750			

STRONTIUM

Bibliography: State Mineralogist Report XXVI, XXVII, Bulletins 67, 91. U. S. G. S. Bull. 540; 660-I.

There has been no production of strontium minerals in California since 1918, though in that year both celestite ($SrSO_4$), and the carbonate, strontianite ($SrCO_3$) were shipped. The first recorded commercial output of strontium minerals in California was in 1916. The occurrence of the carbonate is particularly interesting and valuable, as it appears to be the only considerable deposit of commercial importance so far opened up in the United States. Shipments reported as averag-

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ing 80% $SrCO_3$ have been made. The deposit is associated with deposits of barite near Barstow, San Bernardino County. The carbonate has also been found in massive form near Shoshone, Inyo County. In addition to Imperial County, celestite is found near Calico and Ludlow, and in the Avawatz Mountains in San Bernardino County, but as yet undeveloped.

Production of strontium minerals in California, by years, has been as follows:

Year	Tons	Value
1916	57	$2,850
1917	3,050	37,000
1918	2,900	33,000
1919	----	----
Totals	6,007	$72,850

SULPHUR

Bibliography: State Mineralogist Reports IV, XIII, XIV, XXV. Bulletins 38, 67, 91.

During 1935 there was a single producer of sulphur in California, the material coming from Inyo County. The annual details are concealed in the 'Unapportioned' item so as not to reveal the output of the operator.

In 1934 the production was 4,412 short tons valued at $67,656, which came from two properties in Inyo County and one in Alpine County. The 1934 output of sulphur was the largest annual recorded in this State.

The 1929-1931 output, which came from Colusa County, and was utilized in the manufacture of a fertilizer and for dusting for mildew. These were the commercial operation of mining sulphur. The last previous production was in 1923 and 1924 and came from Kern County. This mineral has been found to some extent in Alpine, Colusa, Imperial, Inyo, Kern, Lake, Sonoma, Tehama, and Ventura counties.

Total Production of Sulphur in California.

Sulphur was produced at the famous Sulphur Bank mine in Lake County, during the years 1865-1868 (inc.); following which the property became more valuable for its quicksilver. The Elgin quicksilver mine, near Wilbur Springs, Colusa County, is a similar occurrence.

Production of sulphur in California to date:

Year	*Tons*	*Value*
1865, 1866, 1867 *	941	$53,500
1868 to 1922	----	------
1923, 1924 *	185	4,071
1925 to 1928	----	------
1929, 1930, 1931 *	265	9,025
1932, 1933 *	1,991	32,838
1934	4,412	67,656
1935	*	*
Totals	7,794	$167,090

* Annual details concealed under 'Unapportioned.'

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WOLLASTONITE

During 1935 there were no commercial shipments of wollastonite reported in California. In 1934 there was production coming from a single property in Kern County. The annual details are concealed in the 'Unapportioned' item so as not to reveal the output of the single operator.

The first commercial production of wollastonite was made in 1933 from a deposit operated by John T. Thorndyke in the Radamacher District in Kern County, and was shipped from Code's Siding to Los Angeles, where it is used to manufacture mineral wool. This is being done by a new process in an electric furnace where the material is melted without the use of a flux and then blown to a fine fiber or wool by compressed air from jets. The mineral wool is an excellent insulating material for sound, heat and cold, and the manufacturer expects to use large quantities in the proposed steel houses. This material, also, can be used in the manufacture of unbreakable glass. This is the first recorded commercial production of wollastonite in California, and apparently also the first in the United States.

Wollastonite is a calcium metasilicate ($CaSiO_3$) and usually found in crystalline linestone at the contact with intrusive igneus rocks. It is a white to gray mineral, having a hardness of $4\frac{1}{2}$ to 5 and a specific gravity of about 2.9.

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CHAPTER SIX

SALINES

Bibliography: State Mineralogist Reports III, XIV, XV, XVII-XXIX (inc.). Bulletin 24. Spurr and Wormser, "Marketing of Minerals." "Non-Metallic Minerals," by R. B. Ladoo. See also under each substance.

Under this heading are included borax, common salt, soda, potash, and other alkiline salts. The first two have been produced in a number of localities in California, more or less regularly since the early sixties. Except for a single year's absence, soda has had a continuous production since 1894. Potash, magnesium chloride and sulphate, and calcium chloride have been added to the commercial list in recent years, joined in 1926 by bromide, and in 1931 by iodine. The nitrates are still prospective.

Our main resources of salines are the lake beds of the desert regions of Imperial, Inyo, Kern, Los Angeles, San Bernardino, and San Luis Obispo counties, and the waters of the Pacific Ocean.

The total value of this group showed a decrease from $10,413,019 in 1934 to $9,700,802 in 1935. The following table gives details for the years 1934 and 1935:

Substance	1934		1935		Increase+ Decrease— Value
	Amount	Value	Amount	Value	
Borates	240,696 tons	$5,524,262	280,249 tons	$4,602,064	$922,198—
Iodine	355,279 lbs.	423,016	*	*	* —
Magnesium salts	2,325 tons	194,642	2,795 tons	235,531	40,889+
Salt	332,194 tons	1,222,810	365,711 tons	1,230,480	7,670+
Soda	99,380 tons	1,219,561	125,504 tons	1,341,045	121,484+
Unapportioned		[a]1,828,728		[b]2,291,682	462,954+
Total values		$10,413,019		$9,700,802	
Net decrease					$712,217—

* Included under 'Unapportioned.'
[a] Includes bromine, calcium chloride and potash.
[b] Includes bromine, calcium chloride, iodine and potash.

BORATES

Bibliography: State Mineralogist Reports III, X, XII-XV (inc.), XVII-XXIX (inc.), XXV-XXVII (inc.). Bulletins 24, 67, 91.

During the year 1935 there was produced in California a total of 263,915 short tons of borate materials, compared with 240,732 short tons for 1934.

The material shipped during the year included the new sodium borates, kernite (rasorite) and kramerite from Kern County; also crystalized borax prepared by evaporation of brines at Searles lake in San Bernardino County and Owens Lake in Inyo County.

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As the crude ore is not sold as such, but is almost entirely calcined before shipping to the refinery for conversion into the borax of commerce, and because of the fact that the material varied widely in boric acid content, we have recalculated the tonnage to a basis of 40 per cent, A. B. A. This is approximately the average A. B. A. content of the colemanite material after calcining, and also of the crystallized borax obtained from evaporation of the lake brines.

Recalculated as above, the 1935 production totaled 280,249 short tons valued at $4,602,046. This was an increase in quantity with a decreased value as compared with the 1934 output of 240,696 tons worth $5,524,262.

The total amount of borates exported from the United States during 1935 according to the U. S. Bureau of Foreign and Domestic Commerce,[1] was 114,447 short tons valued at $3,242,350, as compared with 103,643 tons worth $2,997,276 in 1934.

Total Production of Borate Materials in California.

Borax was first discovered in California in the waters of Tuscan Springs in Tehama County, January 8, 1856. Borax Lake in Lake County was discovered in September of the same year by Dr. John A. Veach. This deposit was worked in 1864-1868, inclusive, and during that time produced 1,181,365 pounds of refined borax. The bulk of it was exported by sea to New York. This was the first commercial output of this salt in the United States, and California is still today the leading American producer of borax, having been for many years the sole producer.

Production from the dry lake 'playa' deposits of Inyo and San Bernardino counties began in 1873; but it was not until 1887 that the borax industry was revolutionized by the discovery of the colemanite beds at Calico, in San Bernardino County and later similar beds in Inyo and Los Angeles counties. The colemanite deposits of Ventura County were not worked extensively, owing to lack of transportation facilities. Some production of colemanite has been made from deposits opened up in Clarke County, Nevada. Colemanite was in turn, displaced by the discovery in 1926 of kernite (rasorite) a sodium borate, near Kramer in Kern County.

The total production of borate materials in California is shown in the following table:

[1] Monthly Summary of Foreign Commerce of the United States, Department of Commerce, Dec., 1935.

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Total Production of Borate Materials in California

Year	Tons	Value	Year	Tons	Value
1864	12	$9,478	1901	22,221	$982,380
1865	126	94,099	1902	[1]17,202	2,234,994
1866	201	132,538	1903	34,430	661,400
1867	220	156,137	1904	45,647	698,810
1868	32	22,384	1905	46,334	1,019,158
1869			1906	58,173	1,182,410
1870			1907	53,413	1,200,913
1871			1908	22,200	1,117,000
1872	140	89,600	1909	16,628	1,163,960
1873	515	255,440	1910	16,828	1,177,960
1874	915	259,427	1911	50,945	1,456,672
1875	1,168	289,080	1912	42,135	1,122,713
1876	1,437	312,537	1913	58,051	1,491,530
1877	993	193,705	1914	62,500	1,483,500
1878	373	66,257	1915	67,004	1,663,521
1879	364	65,443	1916	103,523	2,409,375
1880	609	149,245	1917	109,944	2,561,958
1881	690	189,750	1918	88,772	1,867,908
1882	732	201,300	1919	66,791	1,717,192
1883	900	265,500	1920	127,065	2,794,206
1884	1,019	198,705	1921	50,136	1,096,326
1885	942	155,430	1922	[2]39,087	1,068,025
1886	1,285	173,475	1923	62,667	1,893,798
1887	1,015	116,689	1924	52,070	1,599,149
1888	1,405	196,636	1925	46,124	1,526,938
1889	965	145,473	1926	47,605	1,625,298
1890	3,201	480,152	1927	72,462	3,043,260
1891	4,267	640,000	1928	109,722	3,378,552
1892	5,525	838,787	1929	144,678	3,312,085
1893	3,955	593,292	1930	209,869	3,686,817
1894	5,770	807,807	1931	206,405	5,753,037
1895	5,959	595,900	1932	179,356	2,856,470
1896	6,754	675,400	1933	197,495	3,019,513
1897	8,000	1,080,000	1934	240,696	5,524,262
1898	8 300	1,153,000	1935	280,249	4,602,064
1899	20,357	1,139,882			
1900	25,837	1,013,251	Totals	3,162,410	$86,748,953

[1] Refined borax. [2] Recalculated to 40% 'anhydrous boric acid' equivalent beginning with 1922.

BROMINE

The first commercial production of bromine and bromine compounds was begun during 1926 by the California Chemical Corporation in its plant at Chula Vista, San Diego County, from salt works bittern waters. This same plant has been recovering magnesium chloride for a number of years. Bromine is also now being made at a similar bittern-water plant at Newark, Alameda County. The 1935 output showed an increased value with a slight decrease in amount as compared with 1934 production; annual details of which are concealed under the 'Unapportioned' item to conceal the production of the single company which operated both plants.

The total commercial production of bromine in California is as follows:

Year	Tons	Value
1926 1927 1928 1929 1930 1931 1932 1933 1934 1935	1,519	$819,960
Totals		

* Annual details concealed under 'Unapportioned.'

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CALCIUM CHLORIDE

Bibliography: U. S. Geol. Surv., Min. Res. 1919, Pt. II. Engineering and Contracting, Roads and Streets, monthly issue, Feb. 6, 1924. 'How to Maintain Roads,' manual of instruction of Dow Chemical Company.

Calcium chloride is hydroscopic, that is, it has an affinity for water. This property is taken advantage of by utilizing this salt as a drying agent. During 1935 the production of calcium chloride in California came from one plant in San Bernardino County. The annual details are combined under the 'Unapportioned' item to conceal the output of the operator.

Total Calcium Chloride Production in California.

Commercial production of calcium chloride in California was first reported to the State Mining Bureau in 1921, from two plants in San Bernardino County, being obtained as a by-product in the refining of salt from deposits in certain of the desert dry lakes. Total production in California is shown in the following tabulation:

Year	Tons	Value
1921	683	$22,980
1922*		
1923	1,204	26,580
1924*		
1925	10,988	328,876
1926*		
1927	34,195	508,748
1928*		
1929	12,020	114,080
1930*		
1931	9,688	103,237
1932*		
1933	3,103	15,500
1934*	4,048	16,196
1935		
Totals	75,929	$1,136,197

* Annual details concealed under 'Unapportioned.'

IODINE

Bibliography: U. S. Bureau of Mines I. C. 6387.

In 1935 the output of iodine in California came from one plant in Los Angeles County and showed a decrease in both quantity and value over 1934. The annual details for 1935 are concealed under 'Unapportioned' item to conceal the output of an individual operator. The 1934 production came from three plants in Los Angeles County and amounted to 355,279 pounds, valued at $423,016.

Iodine was first produced in California during 1917 to 1921 as a by-product of potash which was reduced from kelp in an experimental station of U. S. Department of Agriculture at Summerland, but after the armistice the demand for these minerals decreased so that the plants in Santa Barbara County closed. In 1929 the General Salt Company erected a plant which reduces iodine from the waste waters of certain deep oil wells in the Long Beach field. During 1933 two more plants started operation, making a total of three producing plants in the State.

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The total production of 1929, 1931 and 1933 combined, in California was 696,297 pounds of iodine worth $1,374,311.

MAGNESIUM SALTS

Bibliography: State Mineralogist Reports XX, XXI, XXV-XXVI (inc.). Bulletin 91. 'Dictionary of Applied Chemistry,' by Thorpe. U. S. Geol. Surv., Min. Res. of P. S.

During 1935 there was an output of magnesium salts in California coming from one plant in San Diego County and two in San Mateo County, amounting to 2,785 short tons valued at $235,531 and consisted of the carbonate and chloride. The 1935 production was an increase in both quantity and value over that of 1934, which was 2,325 tons worth $194,642. The chloride was nearly all sold for use in magnesite stucco and cement mixtures (Sorel cement), also some for road liquor. The carbonate, a bulky white powder, was used as a heat-insulating material, as a filler for rubber, paper, paint, etc., and in medicines, in tooth paste, in face powder and as a polish for metal and glass. The sulphate marketed was utilized for medicinal and bath purposes. The material coming from San Diego County was residual bitterns from the salt plants and was in part marketed in the liquid form carrying from 35 per cent to 67 per cent $MgCl_2$ and in part as dry crystals, while that from San Mateo County was magnesium carbonate.

The average value reported for the chloride produced in California in 1934 was approximately $46.80 per ton, f.o.b. plant.

Total Production of Magnesium Salts in California.

Commercial production of magnesium chloride in California was begun in 1916 by some of the salt companies, from the residual bitterns obtained during the evaporation of sea water for its sodium chloride. In addition, some magnesium sulphate, or 'epsom salts' is also made, annually, but in smaller amount, and magnesium carbonate by a patented process, direct from sea water.

The total production of magnesium salts in California, since the beginning of the industry here, is shown in the following tabulation:

Year	Tons	Value
1916	851	$6,407
1917	1,064	34,973
1918	1,008	29,955
1919	1,616	82,457
1920	3,150	107,787
1921	4,153	106,140
1922	3,036	89,788
1923	3,662	116,031
1924	4,823	145,883
1925	4,221	132,553
1926	4,881	124,470
1927* 1928	6,241	139,589
1929* 1930	4,914	333,906
1931* 1932	2,749	217,979
1933	2,073	159,660
1934	2,325	194,642
1935	2,785	235,531
Totals	53,552	$2,257,751

* Annual details concealed under 'Unapportioned.'

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NITRATES

Bibliography: State Mineralogist Reports XV, XXV, XXVI, XXVII. Bulletins 24, 67, 91. U. S. G. S., Press Bulletin No. 373, July, 1918. Smithsonian Inst., Publ. No. 2421, 1916.

Nitrates of sodium, potassium and calcium have been found in various places in the desert regions of the State, but no deposit of commercial value has been developed as yet. It is hoped that a closer search may some day be rewarded by workable discoveries. At present the principal commercial source of nitrates is the Chilean saltpeter (sodium nitrate) deposits in South America.

The fixation of atmospheric nitrogen electrically has been accomplished successfully in Germany and Scandinavia. The possibilities of cheap hydroelectric power in California make the subject one of interest to us, as we have also the natural raw materials and chemicals to go with the power. Sodium and potassium cyanides can be made by fixation of atmospheric nitrogen electrically.

POTASH

Bibliography: State Mineralogist Reports XV, XVIII, XX, XXII, XXV-XXVII (inc.). Bulletins 24, 67, 91. U. S. G. S., Min. Res. 1913, 1914, 1915. Senate Doc. No. 190, 62 Congress, 2d Session. Mining & Sci. Press, Vol. 112, p. 155; Vol. 114, p. 789. Eng. & Min. Jour.-Press, Vol. 117, p. 557, Apr. 5, 1924.

The 1935 production of potash in California came from a single operator in San Bernardino County, the details of which are concealed under the 'Unapportioned' item. This was principally chloride and the product averaged 60% equivalent K_2O content. The material was sold mainly for fertilizer manufacture.

Imports of crude potash minerals and salts in the United States during 1935, according to the U. S. Bureau of Foreign and Domestic Commerce, amounted to 520,577 long tons, valued at $10,164,029, compared with 413,897 long tons worth $8,840,784 in 1934. These materials consisted mainly of 'manure salts,' crude chloride (muriate) and sulphate, and kainite, all of which are admitted duty free.

Quotations have recently ranged from $33.75 per ton c.i.f. Atlantic and Gulf ports for high grade sulphate (90%-95%), $22.50 per ton for muriate (80%), and $14 for manure salts (30%).

Total Production of Potash in California.

Potash production began commercially in California in 1914, with a small yield from kelp. The bulk of the output comes from deposits of potash-bearing residues and brines in the old lake beds of the desert regions, particularly Searles Lake, San Bernardino County. A small amount has been made from salt-works bitterns, and for a time there was some from Portland cement dust. Some also has been obtained from molasses distillery-slops char.

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The annual amounts and values of these potash materials, since their beginning in California in 1914, have been as follows:

Year	Tons	Value
1914	10	$460
1915	1076	19,391
1916	17,808	663,605
1917	129,022	4,202,889
1918	49,381	6,808,976
1919	28,118	2,415,963
1920	26,298	1,465,463
1921	14,806	390,210
1922	17,776	584,388
1923	29,597	709,836
1924	33,107	747,407
1925	36,355	829,770
1926	32,884	812,285
1927	67,340	1,952,852
1928*	178,680	5,522,350
1929*		
1930*	172,263	5,500,536
1931*		
1932*	153,147	3,932,721
1933*		
1934*	355,604	3,750,809
1935*		
Totals	1,242,372	$39,315,911

* Annual details concealed under 'Unapportioned.'

SALT

Bibliography: State Mineralogist Reports II, XII-XV (inc.), XVII-XXIII (inc.), XXV-XXVII. Bulletins 24, 67, 91. U. S. Geol. Survey, Bull. 669. U. S. Bur. of Mines, Bull. 146.

Most of the salt production in California is obtained by evaporation of water of the Pacific Ocean, plants being located on the shores of San Francisco, Monterey, and San Diego bays, and at Long Beach. Additional amounts are derived from lakes and lake beds in the desert regions (in part, rock salt), mainly in Imperial, Kern, and San Bernardino counties, and evaporation of alkiline lake water in Modoc County. A small amount of valuable medicinal salts has been obtained by evaporation of the water of Lake Mono, Mono County.

During the year 1935, in California there was an output of 365,711 short tons of crude salt valued at $1,230,480, compared with 332,194 short tons worth $1,222,810 in 1934. There were eleven plants operating in 1935 with two each in Alameda and San Bernardino counties, and one each in Imperial, Kern, Los Angeles, Modoc, Monterey, San Diego, and San Mateo counties.

The average value reported for salt produced in California during 1935 was $3.36 per ton f.o.b. plant, as compared with $3.68 in 1934, $3.89 in 1933, $3.58 in 1932, and $3.73 in 1931.

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Production of Salt in California, by Years.

Amount and value of annual production of salt in California from 1887 is shown in the following tabulation:

Year	Tons	Value	Year	Tons	Value
1887	28,000	$112,000	1913	204,407	$462,681
1888	30,800	92,400	1914	223,806	583,553
1889	21,000	63,000	1915	169,028	368,737
1890	8,729	57,085	1916	186,148	455,695
1891	20,094	90,303	1917	227,825	584,373
1892	23,570	104,788	1918	212,076	806,328
1893	50,500	213,000	1919	233,994	896,963
1894	49,131	140,087	1920	230,638	972,648
1895	53,031	150,576	1921	197,989	832,702
1896	64,743	153,244	1922	223,238	819,187
1897	67,851	157,520	1923	275,979	1,130,670
1898	93,421	170,855	1924	318,800	1,159,137
1899	82,654	149,588	1925	284,068	949,826
1900	89,338	204,754	1926	311,761	1,124,978
1901	126,218	366,376	1927	263,028	639,127
1902	115,208	205,876	1928	340,580	1,024,656
1903	102,895	211,365	1929	392,039	2,665,436
1904	95,968	187,300	1930	347,945	1,167,487
1905	77,118	141,925	1931	330,951	1,233,567
1906	101,650	213,228	1932	256,353	918,480
1907	88,063	310,967	1933	321,312	1,251,024
1908	121,764	281,469	1934	332,194	1,222,810
1909	155,680	414,708	1935	365,711	1,230,480
1910	174,920	395,417			
1911	173,332	324,255	Totals	8,450,269	$27,796,001
1912	185,721	383,370			

SODA

Bibliography: State Mineralogist Reports XII, XIII, XV, XVII, XVIII, XX, XXII, XXIII, XXV–XXIX (inc.). Bulletins 24, 67, 91. U. S. Geol. Surv., Bull. 717.

The production of sodium salts in California in 1935 included: Soda ash, trona, caustic soda and bicarbonate from plants at Owens Lake, Inyo County, and soda ash, salt cake and trona ('sesqui-carbonate,' a double salt of Na_2CO_3 and $NaHCO_3$) from Searles Lake, and salt cake from near Twenty Nine Palms, both in San Bernardino County. There were no shipments of salt cake (sulphate) from the Carrizo Plains, San Luis Obispo County.

The output of the year 1935 amounted to 125,504 short tons valued at $1,341,045, as compared with 99,380 short tons worth $1,219,561 in 1934.

The dense ash and bicarbonate were used mainly in the manufacture of soap, glass, paper, oil refining, sugar refining, and chemicals; and the trona for metallurgical purposes.

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Soda Production of California, by Years.

The total output, showing amount and value of these materials in California since the inception of the statistical records of the State Mining Bureau, is given in the table which follows:

Year	Tons	Value	Year	Tons	Value
1894	1,530	$20,000	1916	10,593	$264,825
1895	1,900	47,500	1917	24,505	928,578
1896	3,000	65,000	1918	20,447	855,423
1897	5,000	110,000	1919	21,294	721,958
1898	7,000	154,000	1920	32,407	1,164,898
1899	10,000	250,000	1921	14,828	438,996
1900	1,000	50,000	1922	20,084	573,661
1901	8,000	400,000	1923	34,885	764,284
1902	7,000	50,000	1924	32,536	711,796
1903	18,000	27,000	1925	48,625	947,649
1904	12,000	18,000	1926	63,333	1,305,802
1905	15,000	22,500	1927	62,571	1,478,239
1906	12,000	18,000	1928	80,838	1,469,297
1907	.....	.....	1929	90,646	1,838,657
1908	9,600	14,400	1930	90,122	1,627,344
1909	7,712	11,593	1931	78,701	1,217,811
1910	8,125	11,862	1932	58,017	826,369
1911	9,023	52,887	1933	70,598	1,019,130
1912	7,200	37,094	1934	99,380	1,219,561
1913	1,861	24,936	1935	125,504	1,341,045
1914	6,522	115,396			
1915	5,799	83,485	Totals	1,337,186	$22,298,976

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CALIFORNIA MINERALS

▲ DEPOSITS PRODUCING – AT PRESENT OR RECENT YEARS

X KNOWN DEPOSITS OF COMMERCIAL IMPORTANCE.

O DEPOSITS OF LITTLE OR UNKNOWN COMMERCIAL IMPORTANCE.

ALAMEDA, ALPINE, AMADOR, BUTTE, CALAVERAS, COLUSA, CONTRA COSTA, DEL NORTE, EL DORADO, FRESNO, GLENN, HUMBOLDT, IMPERIAL, INYO, KERN, KINGS, LAKE, LASSEN, LOS ANGELES, MADERA, MARIN, MARIPOSA, MENDOCINO, MERCED, MODOC, MONO, MONTEREY, NAPA, NEVADA, ORANGE, PLACER, PLUMAS, RIVERSIDE, SACRAMENTO, SAN BENITO, SAN BERNARDINO, SAN DIEGO, SAN FRANCISCO, SAN JOAQUIN, SAN LUIS OBISPO, SAN MATEO, SANTA BARBARA, SANTA CLARA, SANTA CRUZ, SHASTA, SIERRA, SISKIYOU, SOLANO, SONOMA, STANISLAUS, SUTTER, TEHAMA, TRINITY, TULARE, TUOLUMNE, VENTURA, YOLO, YUBA

FUELS

- COAL
- NATURAL GAS
- PETROLEUM

METALS

- ANTIMONY
- ARSENIC
- BERYLLIUM
- BISMUTH
- CADMIUM
- COBALT
- COPPER
- GOLD
- IRON ORE
- LEAD
- MANGANESE ORE
- MOLYBDENUM
- NICKEL
- PLATINUM
- QUICKSILVER
- SILVER
- TIN
- TITANIUM
- TUNGSTEN
- VANADIUM
- ZINC

STRUCTURAL MATERIALS

- BITUMINOUS ROCK
- BRICK & HOLLOW BUILDING TILE
- CEMENT
- CHROMITE
- GRANITE
- LIME
- MAGNESITE
- MARBLE
- ONYX & TRAVERTINE
- SANDSTONE
- SERPENTINE
- SLATE
- STONE, MISCELLANEOUS (CRUSHED ROCK, SAND, GRAVEL)

INDUSTRIAL MATERIALS

- ASBESTOS
- BARYTES
- BENTONITE (FULLER'S EARTH)
- CARBON DIOXIDE
- CLAY
- DIATOMITE (DIATOMACEOUS EARTH)
- DOLOMITE
- FELDSPAR
- FLUROSPAR
- GEMS
- GRAPHITE
- GYPSUM
- LIMESTONE
- LITHIA
- MICA
- MINERAL PAINT
- MINERAL WATER
- PHOSPHATES
- PUMICE (LUMP)
- (VOLCANIC ASH)
- PYRITE
- SHALE OIL
- SILICA (QUARTZ)
- (GLASS SAND)
- SILIMANITE-ANDALUSITE-CYANITE GROUP
- SOAPSTONE TALC
- STRONTIUM
- SULPHUR
- WOLLASTONITE

SALINES

- BORATES
- BROMINE
- CALCIUM CHLORIDE
- IODINE
- MAGNESIUM SALTS
- POTASH
- SALT
- SODA

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CHAPTER SEVEN

BY COUNTIES

Introductory.

The State of California includes a total area of 158,297 square miles, of which 155,652 square miles are of land. The maximum width is 235 miles, the minimum 148 miles, and the length from the northwest corner to the southeast corner is 775 miles. The State is divided into fifty-eight counties. The 1930 census figures show a total population for Californa of 5,672,009. Minerals of commercial value exist in every county, and during 1934 some active production was reported to the State Division of Mines from all of the fifty-eight.

Rank of Counties in Mineral Yield, 1935.

Of the ten leading counties in point of total value of mineral output for 1935, the first six, viz., Los Angeles, Kern, Fresno, Orange, Ventura and Kings, also the ninth which is Santa Barbara, owe their position to petroleum and natural gas. Los Angeles County, due to crude oil, led all other counties in 1935, and is credited with 27% of the State's total mineral value, holding this position since 1923 when it passed Kern, which had led the State for many years. San Bernardino (seventh) owes its position to cement, borates, and potash; Nevada (eighth) and Sacramento (tenth) owe their positions to gold.

There were twenty-four counties having a mineral production in excess of a million dollars during 1935 in seven of which petroleum was an important item; in eight, gold; in six, natural gas; in five, cement; in two, borates; and in one each, miscellaneous stone and potash. In point of variety and diversity San Bernardino County led all others in 1935 with a total of twenty-two different mineral products on the commercial list, followed by Los Angeles with nineteen, San Diego with eighteen, Inyo with seventeen; Fresno, Kern, and Riverside each with fifteen; Orange with fourteen; Monterey and San Luis Obispo each with thirteen; El Dorado, Placer, and Sacramento each with twelve; Alameda, Butte and Ventura each with eleven; and Calaveras, Contra Costa, Imperial, Santa Clara, and Tuolumne each with ten.

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	County	Value
1.	Los Angeles	$72,148,990
2.	Kern	46,994,409
3.	Fresno	30,016,686
4.	Orange	24,360,634
5.	Ventura	14,236,946
6.	Kings	10,580,002
7.	San Bernardino	9,886,453
8.	Nevada	9,195,148
9.	Santa Barbara	8,680,173
10.	Sacramento	4,336,763
11.	Amador	2,765,299
12.	El Dorado	2,388,999
13.	Calaveras	2,312,953
14.	Riverside	2,226,623
15.	Alameda	2,010,493
16.	Yuba	1,841,221
17.	Merced	1,704,775
18.	San Mateo	1,590,159
19.	Inyo	1,559,806
20.	Santa Cruz	1,533,433
21.	Contra Costa	1,361,616
22.	Shasta	1,350,262
23.	Placer	1,026,451
24.	Butte	1,009,952
25.	Mariposa	873,242
26.	Sierra	860,716
27.	Trinity	745,186
28.	Siskiyou	705,737
29.	Stanislaus	585,656
30.	Tuolumne	474,610
31.	San Diego	471,387
32.	San Joaquin	416,270
33.	Plumas	414,516
34.	Lake	320,750
35.	Santa Clara	312,676
36.	Madera	306,644
37.	San Luis Obispo	265,443
38.	San Benito	242,254
39.	Mono	223,748
40.	Napa	198,156
41.	Sonoma	170,800
42.	Monterey	132,689
43.	Imperial	124,135
44.	Marin	113,914
45.	Humboldt	85,065
46.	Tulare	53,911
47.	Modoc	52,432
48.	Del Norte	46,589
49.	Glenn	41,287
50.	Yolo	34,665
51.	Lassen	21,732
52.	Tehama	11,391
53.	Mendocino	10,429
54.	Alpine	9,441
55.	Solano	7,450
56.	Colusa	1,901
57.	San Francisco	892
58.	Sutter	357
	Total	$263,404,317

ALAMEDA

Land area: 732 square miles.
Population: 475,153 (1930 census).
Location: East side of San Francisco Bay.
County seat: Oakland.
References: State Mineralogist Report XVII: XVIII: XX: XXVI (Oct. 1929).

Alameda County, while in no sense one of the 'mining counties,' came fifteenth on the list of counties as to value, with a mineral production for 1935 worth $2,010,493, and had eleven different substances. This was a decrease from the 1934 output which was valued at $2,379,633.

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Commercial production for 1935 was as follows:

Substance	*Value*
Brick and hollow building tile	$218,988
Clay, pottery	3,282
Copper	2,250
Stone, miscellaneous	681,555
Other minerals *	1,104,418
Total value	$2,010,493

* Includes bromine, lime, limestone, salt.

ALPINE

Land area: 776 square miles.
Population: 236 (1930 census).
Location: On eastern border of State, south of Lake Tahoe.
County seat: Markleeville.
References: State Mineralogist Report XV: XVII: XVIII: XXVII (Oct., 1931).

Alpine County ranked fifty-fourth in value of output for 1935, which was $9,441, compared with $25,431 in 1934.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$280
Silver	226 fine ozs.	162
Stone, miscellaneous	------	8,989
Other minerals *	------	10
Total value		$9,441

* Includes copper and lead.

AMADOR

Land area: 601 square miles.
Population: 8494 (1930 census).
Location: East-central part of State—Mother Lode District.
County seat: Jackson.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXIII : (April, 1927) : XXX.

Amador County ranked eleventh as to value of mineral output for 1935, with nine different substances worth $2,765,299, compared with $2,400,161 in 1934.

Amador at one time led the State in gold production, though exceeded in 1920-1923 and in 1926-1927 by Yuba and Nevada counties, but in 1925 and 1928 by Yuba only, in 1929-1930 by Nevada only, and in 1931-1934 by Nevada and Sacramento.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Clay (pottery)	37,876 tons	$66,654
Copper	9,641 lbs.	800
Gold	------	2,614,235
Lead	3,271 lbs.	131
Silver	24,534 fine ozs.	17,634
Stone, miscellaneous	------	17,066
Unapportioned *	------	48,779
Total		$2,765,299

* Includes brick and coal.

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BUTTE

Land area: 1722 square miles.
Population: 34,010 (1930 census).
Location: North-central portion of State.
County seat: Oroville.
References: State Mineralogist Report XV : XVII : XVIII : XXIV : XXVI (Oct., 1930) : XXXI (Jan., 1936).

Butte County ranked twenty-fourth in California in regard to value of mineral output in 1935, with eleven different substances, having a total value of $1,009,952, as compared with $637,962 in 1934.

Substance	*Amount*	*Value*
Gold	------	$952,632
Silver	5,923 fine ozs.	4,257
Stone, miscellaneous	------	49,653
Copper	2,001 lbs.	166
Unapportioned *	------	3,244
Total		$1,009,952

* Includes brick, gems (diamonds), lead, mineral water, natural gas, soapstone.

CALAVERAS

Land area: 1027 square miles.
Population: 6009 (1930 census).
Location: East-central portion of State—Mother Lode District.
County seat: San Andreas.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXI : XXXII (July, 1936).

Calaveras County ranked thirteenth in California in regard to value of mineral output in 1935 with a total of $2,312,953, as compared with $2,196,592 in 1934. The increase was due to gold. Commercial production for 1935 consisting of nine different substances, was as follows:

Substance	*Amount*	*Value*
Gold	------	$1,607,242
Silver	11,434 fine ozs.	8,218
Stone, miscellaneous	------	56,519
Unapportioned*	------	640,974
Total		$2,312,953

* Includes cement, clay, copper, lead, mineral water.

COLUSA

Land area: 1140 square miles.
Population: 10,257 (1930 census).
Location: Sacramento Valley.
County seat: Colusa.
References: State Mineralogist Report XIV : XVII : XVIII : XXV : (April, 1929).

Colusa County ranked fifty-sixth in regard to the value of mineral output in 1935 with six different mineral substances worth a total of $1,901 as compared with $45,875 in 1934.

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Commercial production for 1935 was as follows:

Substance	Amount	Value
Gold	------	$938
Silver	9 fine ozs.	6
Unapportioned *	------	957
Total		$1,901

* Includes petroleum, quicksilver, stone (miscellaneous).

CONTRA COSTA

Land area: 714 square miles.
Population: 78,554 (1930 census).
Location: East side of San Francisco Bay.
County seat: Martinez.
References: State Mineralogist Report XVII : XVIII : XXIII (Jan., 1927).

Contra Costa County stands twenty-first on the list in respect to value of mineral output for 1935, with ten different substances worth $1,361,616, as compared with $1,734,999 in 1934.

Commercial production for 1935 was as follows:

Substance	Value
Brick and hollow building tile	$368,028
Stone, miscellaneous	274,237
Unapportioned *	719,351
Total	$1,361,616

* Includes cement, clay (pottery), copper, lead, mineral water, silica (glass sand).

DEL NORTE

Land area: 1024 square miles.
Population: 4734 (1930 census).
Location: Extreme northwest corner of State.
References: State Mineralogist Report XIV:XVII:XXI (July, 1925):XXIX Jan.-April, 1933).

Del Norte County was in forty-eighth place as to mineral production for 1935, with four different substances worth $46,589, as compared with $81,998 in 1934.

Substance	Amount	Value
Gold	------	$4,798
Silver	5 fine ozs.	3
Stone, miscellaneous	------	41,788
Total		$46,589

EL DORADO

Land area: 1753 square miles.
Population: 8303 (1930 census).
Location: East-central portion of the State, northernmost of the Mother Lode counties.
County seat: Placerville.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXII (Oct., 1926) : XXXI.

El Dorado County, which contains the location where gold in California was first heralded to the world, comes twelfth on the list

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of counties ranked according to value for 1935, with twelve different mineral substances worth $2,388,999. In addition to the segregated figures here given, a large tonnage of limestone is annually shipped for use in cement manufacture, the value being included in the State's total for cement. The 1934 output was valued at $1,738,576. Gold accounts for the increased value.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Copper	12,391 lbs.	$1,028
Gold	------	1,803,368
Limestone	151,814 tons	298,867
Silver	8,268 fine ozs.	5,943
Stone, miscellaneous	------	46,886
Unapportioned *	------	232,907
Total		$2,388,999

* Includes lead, lime, mineral water, silica (quartz), slate, soapstone.

FRESNO

Land area: 5950 square miles.
Population: 144,369 (1930 census).
Location: South-central portion of State.
County seat: Fresno.
References: State Mineralogist Report XIV : XVII : XVIII : XXV (July, 1929).

Fresno County, third in importance as a mineral producer among the counties of California, reports an output for 1935 of fifteen different mineral substances, with a total value of $30,016,686, as compared with the 1934 value of $7,772,807.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$20,645
Gypsum	6,633 tons	19,899
Natural gas	63,579,904 M cu. ft.	3,687,049
Petroleum	27,679,545 bbls.	26,047,611
Silver	166 fine ozs.	119
Stone, miscellaneous	------	161,760
Unapportioned *	------	79,603
Total		$30,016,686

* Includes brick and hollow building tile, chromite, copper, diatomite, granite, limestone, quicksilver.

GLENN

Land area: 1259 square miles.
Population: 10,935 (1930 census).
Location: West side of Sacramento Valley.
County seat: Willows.
References: State Mineralogist Report XIV : XVII : XVIII.

Glenn County stands forty-ninth as a mineral producing county of the State for 1935 and owes its position mainly to the presence of large deposits of sand and gravel, much of which is used as railroad ballast.

Commercial production for 1935 was as follows, being an increase of $30,608, the output for the previous year:

Substance	*Value*
Stone, miscellaneous	$41,285
Gold	2
Total	$41,287

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HUMBOLDT

Land area: 3634 square miles.
Population: 43,189 (1930 census).
Location: Northwestern portion of State, bordering on Pacific Ocean.
County seat: Eureka.
References: State Mineralogist Report XIV : XVII : XVIII : XXI (July, 1925).

Humboldt County ranked forty-fifth in the value of its mineral output among the counties of the State for 1935, with seven different mineral substances valued at $85,065, compared with the 1934 output worth $81,432.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$31,677
Silver	98 fine ozs.	70
Stone, miscellaneous	------	50,707
Unapportioned *	------	2,611
Total		$85,065

* Includes brick, clay, natural gas.

IMPERIAL

Land area: 4089 square miles.
Population: 60,894 (1930 census).
Location: Extreme southeast corner of the State.
County seat: El Centro.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXII (April, 1926).

Imperial County ranked forty-third in total value of mineral output for 1935, with ten different mineral substances, worth $124,135, compared with $108,480 for 1934.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$59,406
Silver	4,147 fine ozs.	2,981
Stone, miscellaneous	------	20,695
Unapportioned *	------	41,053
Total		$124,135

* Includes carbon dioxide, gypsum, mica, pumice, salt, cyanite.

INYO

Land area: 10,019 square miles.
Population: 6557 (1930 census).
Location: Lies on eastern border of State, north of San Bernardino County.
County seat: Independence.
References: State Mineralogist Report XV : XVII : XVIII : XX : XXII (Oct., 1926) : XXVII : XXX.

Inyo County's mineral output for 1935 reached a total value of $1,559,806, having seventeen different mineral substances and standing nineteenth among the counties of the State as to value of production. The 1934 yield was worth $1,293,725.

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Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Copper	42,589 lbs.	$3,535
Gold	------	656,339
Lead	578,583 lbs.	23,143
Pumice and volcanic ash	954 tons	10,034
Silver	38,429 fine ozs.	27,621
Zinc	274,725 lbs.	12,088
Unapportioned *	------	827,046
Total		$1,559,806

* Includes bentonite, borates, dolomite, quicksilver, slate, talc, soda, sulphur, stone (miscellaneous).

KERN

Land area: 8003 square miles.
Population: 82,219 (1930 census).
Location: South-central portion of State.
County seat: Bakersfield.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXV (Jan., 1929) : XXIX (July-Oct., 1933) : XXX.

Kern County, because of its immensely productive oil fields, for many years stood preeminent among all counties of California in the value of its mineral output. It was surpassed by Los Angeles and Orange counties in 1923, but by Los Angeles only in 1924-1935, for which petroleum is responsible. The 1935 production consisted of fifteen different mineral substances valued at $46,944,409, compared with the 1934 output worth $37,053,187.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Copper	37,971 lbs.	$3,152
Gold	------	1,391,646
Lead	2,180 tons	87
Natural gas	36,089,134 M cu. ft.	1,891,675
Petroleum	54,723,481 bbls.	39,905,553
Silver	147,447 fine ozs.	105,978
Stone, miscellaneous	------	124,360
Unapportioned *	------	352,198
Total		$46,944,409

* Includes borates, brick, cement, clay (oil-well drilling mud), volcanic ash, salt, tungsten.

KINGS

Land area: 1559 square miles.
Population: 25,277 (1930 census).
Location: South-central portion of the State.
County seat: Hanford.
References: State Mineralogist Report XIV : XVII : XVIII : XXVI Oct., 1930).

Kings County, previous to the discovery of Kettleman Hills oil fields in 1928, had little or no mineral output, but in 1929 it ranked ninth in total value of annual mineral production, seventh in 1930, third from 1931 to 1934, and sixth in 1935.

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Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Natural gas	65,372,401 M cu. ft.	$3,088,477
Petroleum	7,167,687 bbls.	7,490,233
Gold	------	83
Unapportioned *	------	1,209
Total		$10,580,002

* Includes quicksilver and stone (miscellaneous).

LAKE

Land area: 1278 square miles.
Population: 7166 (1930 census).
Location: About fifty miles north of San Francisco Bay and the same distance inland from the Pacific Ocean.
County seat: Lakeport.
References: State Mineralogist Report XIV : XVII : XVIII : XX : XXV (July, 1929).

Lake County was in thirty-fourth place as to the value of mineral output for 1935, with six different mineral substances, worth $320,750, compared with $260,481 for 1934.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Mineral water	22,410 gal.	$13,909
Quicksilver	4,097 flasks	285,426
Stone, miscellaneous	------	21,315
Gold	------	65
Unapportioned	------	35
Total		$320,750

LASSEN

Land area: 4531 square miles.
Population: 12,587 (1930 census).
Location: Northeast portion of State.
County seat: Susanville.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XXV (Jan., 1929) : XXX : XXXII (Oct., 1936).

Lassen County was in fifty-first place as a mineral producer for 1935, with output as follows, being a decrease from $28,318 which was the value for the previous year:

Substance	*Amount*	*Value*
Gold	------	$12,182
Silver	396 fine ozs.	285
Stone, miscellaneous	------	8,728
Unapportioned	------	537
Total		$21,732

LOS ANGELES

Land area: 4067 square miles.
Population: 2,201,526 (1930 census).
Location: One of the southwestern coast counties.
County seat: Los Angeles.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXIII (July, 1927) : XXX.

The mineral production for Los Angeles County for the year 1935 amounted in value to $72,148,990 as compared with 1934 output worth

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$66,359,227. This accounted for 27% of the entire State's total for 1935 and ranked Los Angeles first in the State as a mineral producer, exceeding Kern County, which was the leader for several years in the past.

Commercial production for 1935, consisting of 19 substances, was as follows:

Substance	*Amount*	*Value*
Brick	38,522 M	$850,415
Hollow building tile	1,164 tons	11,193
Clay, pottery	18,118 tons	11,829
Copper	3,885 lbs.	322
Gold	------	219,405
Mineral water	7,379,521 gals.	647,416
Natural gas	66,416,318 M cu. ft.	4,448,950
Petroleum	70,378,196 bbls.	64,339,261
Sandstone	------	4,578
Silver	5,755 fine ozs.	4,135
Stone, miscellaneous	------	1,135,068
Unapportioned *	------	476,418
Total		$72,148,990

* Includes cement (see San Bernardino County), diatomite, graphite, iodine, lead, salt.

MADERA

Land area: 2112 square miles.
Population: 17,152 (1930 census).
Location: East-central portion of State.
County seat: Madera.
References: State Mineralogist Report XIV : XVII : XVIII : XXIV (Oct., 1928) : XXX : XXXI.

Madera County was in thirty-sixth place as a mineral producer, for 1935, with an output of six different substances valued at $306,644, compared with $264,142 for 1934.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$21,410
Silver	116 fine ozs.	83
Stone, miscellaneous	------	54,871
Unapportioned *	------	230,280
Total		$306,644

*Includes granite, lead, volcanic ash.

MARIN

Land area: 529 square miles.
Population: 41,635 (1930 census).
Location: Adjoins San Francisco on the north.
County seat: San Rafael.
References: State Mineralogist Report XIV : XVII : XVIII : XXII (July, 1926) : XXIX.

Marin County, in forty-fourth place as to the value of mineral output for 1935, with five different mineral substances, had a commercial production as follows:

Substance	*Value*
Stone, miscellaneous	$98,663
Unapportioned *	15,251
Total	$113,914

* Includes brick, gems (jasper), mineral water.

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MARIPOSA

Land area: 1453 square miles.
Population: 2530 (1930 census).
Location: Most southerly of the Mother Lode counties. East central portion of State.
County seat: Mariposa.
References: State Mineralogist Report XIV : XVII : XVIII : XXIV (April, 1928) : XXXI (Jan., 1935).

Mariposa County is one of the distinctly 'mining' counties of the State, although it stands but twenty-fifth on the list of counties in regard to the value of its mineral output for 1935 with a total of $873,242, as compared with $807,908 for 1934. Mariposa County is also the source of a large tonnage of limestone annually, which is otherwise credited to cement manufacture in Merced County.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Copper	2,252 lbs.	$187
Gold	------	514,544
Lead	1,438 lbs.	57
Silver	6,835 fine ozs.	4,913
Stone, miscellaneous	------	178,266
Unapportioned *	------	175,275
Total		$873,242

* Includes barite and granite.

MENDOCINO

Land area: 3453 square miles.
Population: 23,491 (1930 census).
Location: Joins Humboldt County on the south and bounded by the Pacific Ocean on the west.
County seat: Ukiah.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX.

Mendocino County's mineral output for 1935 was valued at $10,429 which ranked it fifty-third among the counties of the State as a mineral producer, compared with $14,351 for 1934. Commercial production for 1935 was as follows:

Substance	*Value*
Stone, miscellaneous	$10,389
Unapportioned	40
Total	$10,429

MERCED

Land area: 1995 square miles.
Population: 36,900 (1930 census).
Location: About the geographical center of the State.
County seat: Merced.
References: State Mineralogist Report XIV : XVII : XVIII : XXI (April, 1925) : XXXI (Jan. 1935).

Merced County ranks seventeenth as to the value of mineral output for 1935, with five different substances worth $1,704,775 compared with $1,050,492 for 1934.

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Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$1,302,369
Silver	3,841 fine ozs.	2,761
Stone, miscellaneous	------	14,750
Unapportioned	------	384,895
Total		$1,704,775

MODOC

Land area: 3823 square miles.
Population: 8038 (1930 census).
Location: The extreme northeast corner of the State.
County seat: Alturas.
References: State Mineralogist Report XV : XVII : XVIII : XXV (Jan., 1929) : XXX : XXXII (Oct., 1936).

Modoc County, in forty-seventh place, with six different mineral substances, reported a commercial production as follows:

Substance	*Amount*	*Value*
Gold	------	$84
Silver	11 fine ozs.	8
Stone, miscellaneous	------	51,550
Unapportioned	------	790
Total		$52,432

MONO

Land area: 3030 square miles.
Population: 1359 (1930 census).
Location: Is bordered by the State of Nevada on the east and is about in the central portion of the State measured on a north and south line.
County seat: Bridgeport.
References: State Mineralogist Report XV : XVII : XVIII : XX : XXIII (Oct., 1927) : XXX.

Mono County, in thirty-ninth place with eight different mineral substances, reported a commercial production for 1935 as follows:

Substance	*Amount*	*Value*
Gold	------	$39,994
Lead	6,305 lbs.	252
Silver	101,066 fine ozs.	72,634
Stone, miscellaneous	------	38,032
Copper	1,295 lbs.	107
Unapportioned	------	72,729
Total		$223,748

MONTEREY

Land area: 3330 square miiles.
Population: 53,668 (1930 census).
Location: West-central portion of State, bordering on Pacific Ocean.
County seat: Salinas.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XXI (Jan., 1925) : XXXI.

Monterey County produced thirteen different mineral substances during 1935, having a total value of $132,689, as compared with $190,902 for 1934.

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In forty-second place, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$297
Sandstone	------	4,370
Silver	1 fine oz.	1
Stone, miscellaneous	------	61,261
Unapportioned *	------	66,760
Total		$132,689

* Includes coal, diatomite, dolomite, gems (jasper), natural gas, petroleum, quicksilver, salt.

NAPA

Land area: 783 square miles.
Population: 22,832 (1930 census).
Location: Directly north of San Francisco Bay—one of the 'bay counties.'
County seat: Napa.
References: State Mineralogist Report XIV : XVII : XVIII : XX : XXV (April, 1929).

In 1935 the value of Napa County's mineral output was $198,156, placing it in fortieth place in the list of counties, as compared with $398,214 for 1934.

With nine different mineral substances, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$3,984
Mineral water	38,000 gals.	3,650
Quicksilver	1,109 flasks	60,649
Silver	11,785 fine ozs.	8,470
Unapportioned *	------	121,403
Total		$198,156

* Includes chromite, copper, pumice, stone (miscellaneous).

NEVADA

Land area: 974 square miles.
Population: 10,589 (1930 census).
Location: North of Lake Tahoe on the eastern border of the State.
County seat: Nevada City.
References: State Mineralogist Report XVI : XVII : XVIII : XIX : XX : XXVI (April, 1930) : XXXI : XXXII.

Nevada County, one of the mountain counties of California, for some years alternated with Amador in the gold lead, but both were passed by Yuba in 1918-1921, also 1923. In 1922, 1924, 1929 to 1935, Nevada led all counties in gold output, but it held third place in 1925 and 1928, and second place in 1926 and 1927. Nevada County stands eighth on the list of counties in regard to value of its mineral output for 1935, with seven different mineral substances worth $9,195,148, as compared with $7,488,996 for 1934. The increase was due mainly to gold and silver.

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Substance	Amount	Value
Copper	201,890 lbs.	$16,757
Gold	------	8,785,099
Lead	355,526 lbs.	14,221
Silver	520,362 fine ozs.	374,010
Stone, miscellaneous	------	2,661
Unapportioned	------	2,400
Total		$9,195,148

ORANGE

Land area: 795 square miles.
Population: 118,611 (1930 census).
Location: Southwest portion of the State, bordering Pacific Ocean.
County seat: Santa Ana.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXI (Jan., 1925) : XXXI.

Orange County, in fourth place as to value of mineral output for 1934, produced fourteen mineral substances, worth $24,360,634, as compared with $25,746,031 for 1934.

Commercial production for 1935 was as follows:

Substance	Amount	Value
Clay, pottery	19,276 tons	$60,021
Gold	------	1,154
Lead	39,981 lbs.	1,599
Natural gas	25,810,647 M cu. ft.	1,802,397
Petroleum	24,971,601 bbls.	22,422,526
Silver	15,461 fine ozs.	11,113
Stone, miscellaneous	------	45,311
Zinc	------	2,344
Unapportioned *	------	14,169
Total		$24,360,634

* Includes brick, copper, mineral water, silica (glass sand), zinc.

PLACER

Land area: 1395 square miles.
Population: 24,442 (1930 census).
Location: Eastern border of State directly west of Lake Tahoe.
County seat: Auburn.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XX : XXIII (July, 1927) : XXXI : XXXII (Jan., 1936).

Placer County in twenty-third place, with twelve different mineral substances had a commercial production for 1935 as follows, compared with $678,232 for the previous year:

Substance	Amount	Value
Clay, pottery	49,508 tons	$76,141
Gold	------	925,309
Silver	18,941 fine ozs.	13,614
Stone, miscellaneous	------	3,631
Copper	3,178 lbs.	263
Unapportioned *	------	7,493
Total		$1,026,451

* Includes brick, chromite, granite, lead, mineral paint, silica (quartz).

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PLUMAS

Land area: 2594 square miles.
Population: 7909 (1930 census).
Location: Northeastern border of State, south of Lassen County.
County seat: Quincy.
References: State Mineralogist Report XVI : XVII : XVIII : XIX : XX : XXIV (Oct., 1928) : XXIX : XXX.

Plumas County's mineral output for 1935 with eight different mineral substances was valued at $414,516 as compared with $181,143 for 1934.

In thirty-third place, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Copper	1,654,113 lbs.	$137,291
Gold	------	207,856
Lead	1,331 lbs.	53
Silver	47,864 fine ozs.	34,402
Stone, miscellaneous	------	15,054
Unapportioned*	------	19,860
Total		$414,516

* Includes barite and granite.

RIVERSIDE

Land area: 7240 square miles.
Population: 82,078 (1930 census).
Location: Southern portion of State.
County seat: Riverside.
References: State Mineralogist Report XV : XVII : XVIII : XX : XXV (Oct., 1929) : XXX : XXXI.

Riverside is the fourth county in the State in size and the fourteenth in regard to the total value of mineral output for 1935. Within its borders are included mountain, desert, and agricultural land. In point of variety Riverside County showed fifteen different mineral substances commercially produced in 1935 with a total value of $2,226,623, compared with the 1934 output which was valued at $2,590,545.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Clay, pottery	54,356 tons	$73,809
Gold	------	112,057
Lead	15,393 lbs.	616
Silver	2,717 fine ozs.	1,953
Stone, miscellaneous	------	166,623
Copper	2,073 lbs.	172
Unapportioned*	------	1,871,393
Total		$2,226,623

* Includes brick and hollow building tile, cement, gems (Iceland spar), gypsum, manganese ore, mineral water, silica (glass sand).

SACRAMENTO

Land area: 983 square miles.
Population: 141,915 (1930 census).
Location: North-central portion of State.
County seat: Sacramento.

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References: State Mineralogist Report XV : XVII : XVIII : XX : XXI (Jan., 1925) : XXXI.

Sacramento stands tenth among the counties of the State as a mineral producer, the output, principally gold, for 1935 being valued at $4,332,628 as compared with the 1934 production worth $3,877,757. In regard to gold output alone, this county ranks second, being exceeded only by Nevada, the Sacramento product coming from the dredges. With eleven mineral substances, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Brick and hollow building tile	------	$77,562
Gold	------	3,983,985
Silver	4,400 fine ozs.	3,163
Stone, miscellaneous	------	242,837
Unapportioned	------	29,216
Total		$4,332,628

SAN BENITO

Land area: 1392 square miles.
Population: 11,310 (1930 census).
Location: West-central portion of State.
County seat: Hollister.
References: State Mineralogist Report XV : XVII : XVIII : XX : XXII (April, 1926).

San Benito County ranked thirty-eighth among the counties in regard to the value of total mineral production for 1935, having an output worth $242,254 as compared with $266,857 for the previous year.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Quicksilver	791 flasks	$55,015
Unapportioned*	------	187,239
Total		$242,254

* Includes bentonite and stone miscellaneous.

SAN BERNARDINO

Land area: 20,157 square miles.
Population: 133,827 (1930 census).
Location: Southeastern portion of State.
County seat: San Bernardino.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XXVI (July, 1930) : XXVII (July, 1931 : XXX.

San Bernardino, by far the largest county in the State in area, ranked seventh in regard to the value of mineral output for 1935 with a total of $9,886,453 as compared with the 1934 total of $10,537,050.

San Bernardino, for several years (except 1918), has led all other counties in the State in point of variety of minerals, producing commercially during 1935 a total of twenty-two different substances.

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Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Bentonite	4,028 tons	$37,695
Clay (pottery)	2,623 tons	23,690
Copper	19,553 lbs.	1,623
Gold	------	279,020
Lead	123,776 lbs.	4,951
Silver	159,633 fine ozs.	114,736
Stone, miscellaneous	------	199,292
Unapportioned*	------	9,225,446
Total		$9,886,453

* Includes tungsten, borates, brick, calcium chloride, cement, iron, lime, limestone, onyx, mineral water, potash, salt, talc, soda.

SAN DIEGO

Land area: 4221 square miles.
Population: 209,477 (1930 census).
Location: Extreme southwest corner of State.
County seat: San Diego.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXI (July, 1925), XXX.

San Diego County ranks thirty-first in the total value of its mineral output for the year 1935 with eighteen different mineral substances on the commercial list. The value for 1935 was $471,387, as compared with the 1934 output worth $487,266.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$10,367
Granite	6,189 cu. ft.	10,614
Lead	8,323 lbs.	333
Silver	90 fine ozs.	65
Stone miscellaneous	------	198,070
Unapportioned*	------	251,938
Total		$471,387

* Includes bentonite, brick and hollow building tile, bromine, clay (pottery), copper, feldspar, gems (kunzite and tourmaline), magnesium salt, mineral water, salt, silica (quartz), tube-mill pebbles.

SAN FRANCISCO

Land area: 46½ square miles.
Population: 637,212 (1930 census).
County seat: San Francisco.
References: State Mineralogist Report XVII : XVIII : XX : XXV (April, 1929).

Surprising as it may appear at first glance, San Francisco County is listed among the mineral producing sections of the State, actual production consisting mainly of crushed rock, sand, gravel, and mineral water.

In fifty-seventh place, commercial production for 1935 was as follows:

Substance	*Value*
Unapportioned *	$892

* Includes mineral water and miscellaneous stone.

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SAN JOAQUIN

Land area: 1448 square miles.
Population: 102,871 (1930 census).
Location: Central portion of State.
County seat: Stockton.
References: State Mineralogist Report XIV : XVII : XVIII : XXI (April, 1925).

San Joaquin County reported a mineral production for 1935 having a total value of $416,270 as compared with $148,097 for 1934. In thirty-second place, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$99,698
Silver	151 fine ozs.	109
Stone, miscellaneous	------	93,053
Unapportioned*	------	223,408
Total		$416,270

*Includes brick and hollow building tile, and natural gas.

SAN LUIS OBISPO

Land area: 3334 square miles.
Population: 29,617 (1930).
Location: Bordered by Kern County on the east and the Pacific Ocean on the west.
County seat: San Luis Obispo.
References: State Mineralogist Report XV : XVII : XVIII : XXI (Oct., 1925) : XXXI (Oct., 1935).

The total value of the mineral production of San Luis Obispo County in 1935, with thirteen different mineral substances, was $265,443 as compared with $138,453 in 1934. In thirty-seventh place, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$287
Quicksilver	2,474 flasks	167,613
Stone, miscellaneous	------	22,236
Unapportioned*	------	75,307
Total		$265,443

* Includes brick and hollow building tile, chromite, clay (oil-well drilling mud and pottery), limestone, mineral water, petroleum, volcanic ash, sandstone.

SAN MATEO

Land area: 447 square miles.
Population: 77,338 (1930 census).
Location: Peninsula, adjoined by San Francisco on the north.
County seat: Redwood City.
References: State Mineralogist Report XVII : XVIII : XXV (April, 1929) : XXIX.

San Mateo had a mineral output in 1935 of seven different substances having a total value of $1,590,159, as compared with the 1934 production worth $1,562,490.

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In eighteenth place, commercial production for 1935 was as follows:

Substance	*Value*
Stone, miscellaneous	$98,488
Unapportioned*	1,491,671
Total	$1,590,159

* Includes cement, limestone, magnesium salts, salt.

SANTA BARBARA

Land area: 2740 square miles.
Population: 65,075 (1930 census).
Location: Southwestern portion of State, adjoining San Luis Obispo on the south.
County seat: Santa Barbara.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XXI (Oct., 1925) : XXXII.

Santa Barbara County owes its position of ninth place in the State in regard to its mineral output to the presence of productive oil fields within its boundaries. The total value of its mineral production during the year 1935 was $8,680,173 as compared with the 1934 output of $7,570,191.

With nine different substances, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Natural gas	4,596,531 M cu. ft.	$524,998
Petroleum	7,649,068 bbls.	7,068,739
Quicksilver	383 flasks	26,510
Stone, miscellaneous	------	8,081
Unapportioned*	------	1,051,845
Total		$8,680,173

* Includes bituminous rock, diatomite, mineral water.

SANTA CLARA

Land area: 1328 square miles.
Population: 144,921 (1930 census).
Location: West-central portion of State.
County seat: San Jose.
References: State Mineralogist Report XVII : XVIII : XX : XXVI (Jan., 1930) : XXIX.

Santa Clara County reported a mineral output for 1935 of $312,676, as compared with the 1934 figures of $386,445.

In thirty-fifth place with ten mineral substances, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Brick	3,886 M	$44,541
Clay, pottery	2,778 tons	2,263
Limestone (shells)	30,613 tons	71,381
Quicksilver	81 flasks	5,474
Stone, miscellaneous	------	112,043
Unapportioned*	------	76,974
Total		$312,676

* Includes gems (jasper) magnesite, natural gas, petroleum.

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SANTA CRUZ

Land area: 435 square miles.
Population: 37,405 (1930 census).
Location: Bordering Pacific Ocean, just south of San Mateo County.
County seat: Santa Cruz.
References: State Mineralogist Report XVII : XVIII : XXII (Jan., 1926) : XXIX.

The mineral output of Santa Cruz County, a portion of which is itemized below, amounted to a total of $1,533,433 for 1935 giving the county a standing of twentieth among all others in the State in this regard. This is an increase over the 1934 figures of $1,796,844.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$617
Silver	8 fine ozs.	6
Stone, miscellaneous	------	78,743
Unapportioned*	------	1,454,067
Total		$1,533,433

* Includes bituminous rock, cement, lime, limestone, marble (limestone).

SHASTA

Land area: 3858 square miles.
Population: 13,925 (1930 census).
Location: North-central portion of State.
County seat: Redding.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XXII (April, 1926) : XXIX (Jan., April, 1933) : XXX.

Shasta County stood twenty-second in California among the mineral producing counties in 1935, with an output valued at $1,350,262 as compared with the 1934 production worth $1,145,180.

With nine mineral substances, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$962,448
Copper	6,178 lbs.	513
Lead	1,747 lbs.	70
Silver	33,121 fine ozs.	23,805
Stone, miscellaneous	------	72,850
Unapportioned*	------	290,576
Total		$1,350,262

* Includes chromite and pyrite.

SIERRA

Land area: 923 square miles.
Population: 2419 (1930 census).
Location: Eastern border of State just north of Nevada County.
County seat: Downieville.
References: State Mineralogist Report XVI : XVII : XVIII : XX : XXV (April, 1929) : XXXI.

Sierra County reported a mineral production of $860,716 in 1935 which was mainly gold, as compared with the 1934 output worth $1,046,307.

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In twenty-sixth place, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$841,218
Copper	1,612 lbs.	134
Lead	964 lbs.	38
Silver	4,532 fine ozs.	3,257
Stone, miscellaneous	------	16,069
Total		$860,716

SISKIYOU

Land area: 6256 square miles.
Population: 25,505 (1930 census).
Location: Extreme north-central portion of State, next to Oregon boundary.
County seat: Yreka.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXI (Oct., 1925) : XXVIII (Jan., 1931) : XXIX : XXX : XXXI (July, 1935).

Siskiyou, fifth county in California in regard to size, located in a highly mineralized and mountainous country, ranks twenty-eighth in regard to mineral output with eight mineral substances for 1935. The 1934 production was valued at $648,166.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$575,676
Silver	2,240 fine ozs.	1,610
Stone, miscellaneous	------	66,664
Unapportioned*	------	61,787
Total		$705,737

* Includes copper, mineral water, pumice, tube-mill pebbles.

SOLANO

Land area: 822 square miles.
Population: 40,807 (1930 census).
Location: Touching San Francisco Bay on the northeast.
County seat: Fairfield.

Solano, while mostly valley land, produced mineral substances during the year 1935 to the total value of $7,450, ranking it fifty-fifth among the counties of the State, compared with the 1934 output worth $23,641.

Commercial production was as follows:

Substance	*Value*
Onyx and travertine	$5,450
Stone, miscellaneous	2,000
Total	$7,450

SONOMA

Land area: 822 square miles.
Population: 62,248 (1930 census).
Location: South of Mendocino County, bordering on the Pacific Ocean.

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County seat Santa Rosa.
References: State Mineralogist Report XIV : XVII : XVIII : XXII (July, 1926).

Sonoma County ranked forty-first among the counties of California during 1935 with a mineral output valued at $170,800 as compared with the 1934 figures of $162,005.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Granite (volcanic rock)	------	$11,380
Mineral water	24,474 gals.	4,295
Quicksilver	110 flasks	7,845
Stone, miscellaneous	------	146,963
Gold	------	317
Total		$170,800

STANISLAUS

Land area: 1450 square miles.
Population: 56,624 (1930 census).
Location: Center of State, bounded on south by Merced County.
County seat: Modesto.
References: State Mineralogist Report XIV : XVII : XVIII : XXI (April, 1925).

Gold has usually been the chief mineral product of Stanislaus County, but it was exceeded in 1918-1919 by manganese, and in 1921-1923 and 1925-1930 by miscellaneous stone. This county for 1935 ranked twenty-ninth in the State in regard to minerals, with an output valued at $585,656 as compared with $418,172 in 1934.

Commercial prouction for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$293,129
Silver	1,064 fine ozs.	765
Stone, miscellaneous	------	111,912
Unapportioned*	------	179,850
Total		$585,656

* Includes clay (pottery) and magnesite.

SUTTER

Land area: 608 square miles.
Population: 14,618 (1930 census).
Location: Bounded by Butte County on the north and Sacramento on the south.
County seat: Yuba City.
References: State Mineralogist Report XV : XVII : XVIII.

Sutter is one of only two counties in the State which for a number of years reported no commercial output of some kind of mineral substance. In 1917 some crushed rock was taken out, from the Marysville Buttes, also in 1925-1928.

There has been some utilization of natural gas. Both clay and coal exist here, but deposits of neither mineral have been placed on a

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productive basis. During 1935, there was a mineral output, which was valued at $357.

TEHAMA

Land area: 2893 miles.
Population: 13,839 (1930 census).
Location: North-central portion of the State, bounded on the north by Shasta.
County seat: Red Bluff.
References: State Mineralogist Report XV : XVII : XVIII : XIX : XXIV (July, 1928).

Tehama County stood fifty-second among the mineral producing counties of the State for 1935, with an output valued at $11,391 as compared with the 1934 yield worth $39,575.

Substance	*Value*
Gold	$177
Stone, miscellaneous	11,214
Total	$11,391

TRINITY

Land area: 3166 square miles.
Population: 2811 (1930 census).
Location: Northwestern portion of State.
County seat: Weaverville.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXII (Jan., 1926) : XXIX (Jan., April, 1933) : XXX.

Trinity County's 1935 output of minerals was valued at $745,186, as compared with the 1934 figures of $650,620, mainly due to gold which gives the county the rank of twenty-seventh for the year.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$727,787
Silver	3,487 fine ozs.	2,506
Stone, miscellaneous	------	3,803
Unapportioned*	------	11,090
Total		$745,186

* Includes coal, copper, lead, quicksilver.

TULARE

Land area: 4856 square miles.
Population: 77,375 (1930 census).
Location: Bounded by Inyo on the east, Kern on the south, Fresno on the north.
County seat: Visalia.
References: State Mineralogist Report XV: XVII: XVIII: XX.

Tulare County stands forty-sixth on the list of mineral producing counties for 1935, with eight different mineral substances, having a total value of $53,911 as compared with the 1934 figures of $184,474.

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Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$952
Silver	13 fine ozs.	9
Stone, miscellaneous	------	27,607
Unapportioned*	------	25,343
Total		$53,911

* Includes barite, brick, granite, natural gas, petroleum.

TUOLUMNE

Land area: 2190 square miles.
Population: 9239 (1930 census).
Location: East-central portion of State—Mother Lode District.
County seat: Sonora.
References: State Mineralogist Report XIV : XVII : XVIII : XIX : XX : XXIV (Jan., 1928).

Tuolumne County ranks thirtieth among the counties of the State relative to its total value of mineral output for 1935 with ten different substances. This county ranks first as a producer of marble in the State. The mineral production for 1935 was valued at $474,610 as compared with $423,588 for 1934.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$286,062
Silver	2,753 fine ozs.	1,979
Stone, miscellaneous	------	39,350
Unapportioned*	------	147,219
Total		$474,610

* Includes copper, lead, lime, limestone, marble, slate.

VENTURA

Land area: 1878 square miles.
Population: 54,577 (1930 census).
Location: Southwestern portion of State, bordering on Pacific Ocean.
County seat: Ventura.
References: State Mineralogist Report XV : XVII : XVIII : XX : XXI : XXVIII (July-Oct., 1932).

Ventura is fifth county in the State in respect to the value of its mineral output for 1935. The 1935 mineral production was worth $14,236,946 as compared with the 1934 output valued at $13,688,749.

With eleven different mineral substances, commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$6,783
Natural gas	39,278,994 M cu. ft.	2,036,287
Petroleum	13,333,298 bbls.	12,016,509
Silver	44 fine ozs.	32
Stone, miscellaneous	------	166,553
Unapportioned*	------	10,782
Total		$14,236,946

* Includes brick and hollow building tile, clay (pottery), copper, 'granite' (volcanic rock).

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YOLO

Land area: 1017 square miles.
Population: 23,618 (1930 census).
Location: Sacramento Valley, bounded by Sutter on the east and Colusa on the north.
County seat: Woodland.
References: State Mineralogist Report XIV : XVII : XVIII.

Yolo County in fiftieth place has a commercial production for 1935 as follows, compared with $38,027 for the preceding year:

Substance	*Value*
Gold	$715
Stone, miscellaneous	33,950
Total	$34,665

YUBA

Land area: 639 square miles.
Population: 11,327 (1930 census).
Location: Lies west of Sierra and Nevada counties; south of Plumas.
County seat: Marysville.
References: State Mineralogist Report XV : XVII : XVIII : XX : XXVI (July, 1930) : XXXI.

Yuba County ranked sixteenth among the counties of the State as a mineral producer and fourth in respect to gold, which is obtained mainly by dredgers. The 1934 output was valued at $1,951,046.

Commercial production for 1935 was as follows:

Substance	*Amount*	*Value*
Gold	------	$1,806,355
Silver	3,751 fine ozs.	2,696
Stone, miscellaneous	------	32,163
Unapportioned	------	7
Total		$1,841,221

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CHAPTER VIII

DIRECTORY OF PRODUCERS OF METALLIC AND NONMETALLIC MINERALS IN CALIFORNIA, 1935

NOTE—The producers of natural gas and petroleum will be found in the Quarterly Summary of Operations, California Oil Fields, for July, August and September, 1935 (Vol. 21, No. 1).

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BARITE

Operator	Address	Location of mine
Mariposa County		
National Pigments Co.	Russ Bldg., San Francisco	El Portal
Plumas County		
Synthetic Iron Color Co.	P.O. Box 1157, Richmond	Almanor
Tulare County		
Z. E. Page	129 Honolulu St., Lindsay	Camp Nelson

BENTONITE (FULLER'S EARTH)

Operator	Address	Location of mine
Inyo County		
Chamberlain Co., Inc.	2550 E. 9th St., Los Angeles	Olancha
Kern County		
Muroc Clay Co.	5525 Randolph St., Maywood	Muroc
San Benito County		
D. L. Stewart Property, A. P. Stewart, Lessee	1052 Vermont St., San Jose	Tres Pinos
San Bernardino County		
California Talc Co.	837 Jackson St., Los Angeles	Hector
Hollie H. Thew	515 4th St., San Bernardino	Hector
Velvet-White Mines, Wm. M. Hewson, Operator	Helendale	Helendale
San Diego County		
Standard Oil of California, E. W. Wagy	Standard Oil Bldg., San Francisco	Palm Siding

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BITUMINOUS ROCK

Operator	Address	Location of mine
Santa Barbara County		
Higgins Quarry, D. A. Sattler, Lessee	856 Arguello Rd., Santa Barbara	Carpinteria
Santa Cruz County		
Calrock Asphalt Co.	525 Market St., San Francisco	Majors

BORATES

Operator	Address	Location of mine
Inyo County		
Pacific Alkali Co.	1209 Pacific Mutual Bldg., Los Angeles	Bartlett
Kern County		
Pacific Coast Borax Co.	1014 Central Bldg., Los Angeles	Kramer
San Bernardino County		
American Potash and Chemical Corp.	Trona	Trona
West End Chemical Co.	Syndicate Bldg., Oakland	Searles Lake

BROMINE

Operator	Address	Location of mine
Alameda County		
California Chemical Co.	Mills Tower, San Francisco	Newark
San Diego County		
California Chemical Co.	Mills Tower, San Francisco	San Diego

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CALCIUM CHLORIDE

Operator	Address	Location of mine
San Bernardino County		
California Rock Salt Co.	2465 Hunter St., Los Angeles	Amboy

CARBON DIOXIDE GAS

Operator	Address	Location of wells
Imperial County		
Pacific-Imperial Dri-Ice, Inc., Carl M. Einhart, Pres.	Niland	Niland

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CEMENT

Operator	Address	Location of mine
Calaveras County		
Calaveras Cement Co.	315 Montgomery St., San Francisco	San Andreas
Contra Costa County		
Henry Cowell Lime and Cement Co.	2 Market St., San Francisco	Cowell
Kern County		
Monolith Portland Cement Co.	Bartlett Bldg., Los Angeles	Monolith
Los Angeles County		
Blue Diamond Corp.	1650 S. Alameda St., Los Angeles	Los Angeles
Merced County		
Yosemite Portland Cement Co.	Merced	Merced
Riverside County		
Riverside Cement Co.	621 S. Hope St., Los Angeles	Riverside
San Bernardino County		
California Portland Cement Co.	601 W. 5th St., Los Angeles	Colton
Southwestern Portland Cement Co.	503 Roosevelt Bldg., Los Angeles	Victorville
San Mateo County		
Pacific Portland Cement Co.	111 Sutter St., San Francisco	Redwood City
Santa Cruz County		
Santa Cruz Portland Cement Co.	Crocker Bldg., San Francisco	Davenport

CHROMITE

Operator	Remarks	Address	Location of mine
Fresno County			
Bradley & Ekstrom	s	320 Market St., San Francisco	Tollhouse
Napa County			
C. Circero & Co.	s	Napa	Napa
Placer County			
Daniel Sullivan	s	Alta	Dutch Flat

s. Shipped ore, mined prior to 1935. o. Both mined and shipped in 1935.

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CLAY

(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of plant or pit
Alameda County			
California Pottery Co.	a, c	Niles	Niles
N. Clark & Sons	a, b, c	116 Natomas St., San Francisco	Alameda
Livermore Fire Brick Work and California Brick Plant, W. S. Dickey Clay Mfg. Co.	a, b, c	116 New Montgomery St., San Francisco	Livermore and Fabrico
Interlocking Tile Co.	a, c	Niles	Niles
Kraftile Co., L. J. Layton	a, b, c	Niles	Niles
M & S Tile Co.	a, c	Decoto	Decoto
Remillard Brick Co., R. C. Giroux, Secy.	b	569 3d St., Oakland	Pleasanton
F. R. Stuve	a	717 45th Ave., Oakland	Oakland
Technical Porcelain and China Ware Co.	a	420 Kains Ave., Albany, via Berkeley	Albany
Emeryville Porcelain Works, Westinghouse Elec. & Mfg. Co.	a	62d and Green Sts., Emeryville	Emeryville
Walrich Pottery	a	1285 Hearst Ave., Berkeley	Berkeley
mador County			
M. J. Bacon	c	Ione	Carbondale
Ione Clay and Sand Pit, Cal. Mineral Products Co.	c, f	Kohl Bldg., San Francisco	Ione
Carlyle Clay Deposits, E. E. Tremain	c	Buena Vista, via R.F.D., Ione	Buena Vista
N. Clark & Sons	c	116 Natomas St., San Francisco	Ione
Clay Corp. of California	c	1267 Russ Bldg., San Francisco	Ione
Ione Clay Pit, W. S. Dickey Clay Mfg. Co.	c	116 New Montgomery St., San Francisco	Ione
Ione Fire Brick Co., J. T. Roberts, Mgr.	b	1267 Russ Bldg., San Francisco	Ione
Butte County			
Table Mt. Clay Prod. Co., L. F. Riley, Pres. and Mgr.	b	706 Veatch St., Oroville	Oroville
Calaveras County			
California Pottery Co.	c	Niles	Valley Springs
Contra Costa County			
California Art Tile Corp.	a	Box 1116, Richmond	Richmond
Old Mission Tile Co.	a, c	1 20th St., Richmond	San Pablo
Port Costa Brick Works, C. G. Berg, Pres.	b	6th and Berry Sts., San Francisco	Port Costa
Ed Roberts	c, f	Pittsburg	Pittsburg
Standard Sanitary Mfg. Co., H. W. Creeger, Mgr.	a	Box W. Richmond	Richmond
Stockton Fire Brick Co.	b	Russ Bldg., San Francisco	Pittsburg
United Materials & Richmond Brick Co., Ltd.	a, b, c	P.O. Box 7, Richmond	Richmond
Fresno County			
Craycroft Brick Co.	a, b	Griffith-McKenzie Bldg., Fresno	Fresno
Humboldt County			
D. J. Thompson Brick Co.	a, b, c	Box 16, Myrtle Ave., Eureka	Eureka

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Inyo County			
Chamberlain Co., Inc.	e	2550 E. 9th St., Los Angeles	Olancha
Kern County			
Bakersfield Sandstone Brick Co., Jas. Curran, Mgr.	b	Bakersfield	Bakersfield
King Lumber Co.	b	1402 King St., Bakersfield	Bakersfield
Mojave Corp.	d	Box 174, Los Nietos	Muroc
Los Angeles County			
Alhambra Kilns, Inc., L. C. Merwin	a	Alhambra	Alhambra and Santa Monica
American Refractories Co.	a, b	3132 E. Pico Blvd., Los Angeles	Los Angeles
Angulo Tile Plant	a, c	Reseda	Reseda
Batchelder-Wilson Tile Co.*	a	2633 Artesian St., Los Angeles	Los Angeles
J. A. Bauer Pottery Co.	a	415 W. Ave. 33, Los Angeles	Los Angeles
J. Booth	a, c	1775 Stanford, Santa Monica	Santa Monica
Builders Brick Co., Ltd.	b	177th and Western Aves., Moneta	Moneta
Claycroft Potteries, Fred H. Robertson	a	3101 San Fernando Blvd., Los Angeles	Los Angeles
H. F. Coors Co., Inc.	a	Inglewood	Inglewood
Davidson Brick Co.	b, c	4701 Floral Dr., Los Angeles	Los Angeles
Eljer California Co.	a	4100 Alameda, Los Angeles	Arcadia
Emsco Refractories Co.	a, b	5601 S. Boyle Ave., Vernon	Vernon
Gladding, McBean & Co., Tropico, L. A. & S. M. Plants	a, b, c	660 Market St., San Francisco	Tropico, Los Angeles, Santa Monica, Hermosa Beach and Vernon
Ha-Jo Tile & Pottery Co.	a	2304 E. 52d St., Los Angeles	Los Angeles
Higgins Brick & Tile Works, James R. Higgins	a, b, c	P.O. Box 1225, Moneta	Moneta
Italian Terra Cotta Co.	a	1149 Mission Rd., Los Angeles	Los Angeles
K & K Brick Co., Geo. H. Snyder, Pres.	b	606 Union Bank Bldg., Los Angeles	Bishop Canyon
Long Beach Brick Co., Inc., H. A. Havner, Mgr.	b	422 E. Broadway, Long Beach	Long Beach
Markoff Mosaic Tile Corp.	a	1107 E. Redondo Blvd., Inglewood	Inglewood
Myers Pottery Co.	a	2318 E. 52d St., Los Angeles	Los Angeles
Pacific Clay Products	a, b, c	650 Chamber of Commerce Bldg., Los Angeles	Los Angeles and Los Nietos
Pomona Brick Co., Wm. McMullen, Mgr.	b	Pomona	Pomona
Pomona Tile Mfg. Co.	a	Pomona	Pomona
San Vallee Tile Kilns, R. F. Stubver, Mgr.	a, c	6601 Wilbur, Reseda	Reseda
Santa Catalina Island Co., Wm. Wrigley, Jr.	a, b, c	Avalon	Santa Catalina Island
St. Louis Fire Brick and Clay, Joseph Mesmer	a, b	3050 E. Slauson St., Los Angeles	Los Angeles
Simons Brick Co., Walter R. Simons	a, b, c	1195 S. Boyle Ave., Los Angeles	Los Angeles
Standard Brick Co.	b	1760 S. Soto St., Los Angeles	Los Angeles
Star Brick Co.	b	Moneta	Moneta
Tillotson Clay Products	a, b	3363 Fruitland Rd., Vernon	Vernon
Vernon Potteries	a	2300 E. 52d St., Los Angeles	Vernon
Vitrefrax Corp.	a, b	5100 Pacific Ave., Los Angeles	Vernon
Marin County			
McNear Brick Co.	a, b	McNear Point, San Rafael	McNear

*Sold to J. A. Bauer Pottery Co., November, 1935.

a. Clay products. b. Brick and hollow building tile. c. Crude clay. d. Oil-well drilling-mud. e. Filtering clay. f. Fire sand.

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CLAY—Continued

(Including producers of crude clay and manufacturers of brick, tile, porcelain, etc.)

Operator	Remarks	Address	Location of plant or pit
Orange County			
Arnold Clay Mine, I. P. Arnold	c, f	1846 W. 83d St., Los Angeles	El Toro
Gladding, McBean & Co.	c	660 Market St., San Francisco	Hector
La Bolsa Tile Co., A. W. Griffith	a, b, c	R.F.D. 1, Box 174, Huntington Beach	Smeltzer
Mission Clay Products Co.	a, b, c	Olive	Olive
C. O. Nawton	c	823 Hickory St., Santa Ana	Capistrano
Placer County			
Clay Corp. of Cal.	c	1267 Russ Bldg., San Francisco	Lincoln
Gladding, McBean & Co.	a, b, c	5th floor, 660 Market St., San Francisco	Lincoln
Lincoln Clay Products Co., M. J. Dillman, Mgr.	c	Lincoln	Lincoln
Riverside County			
Alberhill Coal and Clay Co.	c	2406 E. 58th St., Los Angeles	Alberhill
Gladding, McBean & Co.	a, b, c	660 Market St., San Francisco	Alberhill
Los Angeles Brick Co.	a, b, c	1078 Mission Rd., Los Angeles	Alberhill
Pacific Clay Products	c	650 Chamber of Commerce Bldg., LosAngeles	Corona
Temescal Clay Co.	c	5601 S. Boyle Ave., Los Angeles	Temescal
Sacramento County			
Cannon & Co.	a, b, c	Box 802, Sacramento	Ben Ali
H. C. Muddox, Jessie E. Muddox, owner	a, b	30th and L Sts., Sacramento	Sacramento
Sacramento Brick Co.	b	1400 Front St., Sacramento	Sacramento
Valley Brick Co.	b	P.O. Box 1180, Sacramento	Sacramento
San Benito County			
D. L. Stewart Property, A. P. Stewart, lessee	e	1052 Vermont, San Jose	Tres Pinos
San Bernardino County			
California Talc Co.	e	837 Jackson St., Los Angeles	Hector
Hancock Brick Yard, C. P. Hancock & Son	b	4330 Lemon St., Riverside	Highgrove
Hart Clay Deposit, W. K. S. Keoch, lessee	c	2022 Thayer Ave., Los Angeles	Goffs
Kennedy Clay Pit, John Kennedy	c	1306¾ Warren Ave., Los Angeles	Daggett
Standard Sanitary Mfg. Co., Pacific Mines, P. R. Jones, Mgr.	c	Campo	Hart
J. H. Stone	e	Barstow	Barstow
Hollie H. Thew	e	515 4th St., San Bernardino	Hector
Velvet-White Mines, Wm. M. Hewson	c	Helendale	Helendale
San Diego County			
Pacific Clay Products Co.	c	650 Chamber of Commerce Bldg., Los Angeles	Farr Station
Standard Oil Co. of California	e	Standard Oil Bldg., San Francisco	Palm Siding
Union Brick Co., J. W. Rice	b	3565 3d St., North San Diego	Rose Canyon
Vitrified Products Corp.	a, b, c	2841 Jefferson St., North San Diego	North San Diego

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San Joaquin County			
San Joaquin Brick Co., J. F. Stein, Secy.	b	33 S. El Dorado St., Stockton	Stockton
Stockton Brick & Tile Co.	b	McKinley Ave., Stockton	Stockton
San Luis Obispo County			
Antelope Mud Co., W. G. Angus, Mgr.	d	Box 204, Lost Hills	Cholame
San Luis Brick Works, Faulstick Bros.	b, d	San Luis Obispo	San Luis Obispo
San Mateo County			
Richmond Potteries, Inc.	a	Box 187, South San Francisco	South San Francisco
Santa Clara County			
Coyote Creek Clay Beds, L. R. Lenfest	c	1195 E. Santa Clara St., San Jose	San Jose
Garden City Pottery, N. J. Mahone	a	560 N. 6th St., San Jose	San Jose
Gladding Bros. Mfg. Co.	a, b, c	South 3d and Keyes Sts., San Jose	San Jose
Handcraft Tile Co., L. W. Austin et al.	a	R.F.D. 2, Box 121A, San Jose	San Jose
Remillard Brick Co.	b, c	569 3d St., Oakland	San Jose
San Jose Brick Co.	b	P.O. Box 274, San Jose	San Jose
S. & S. Tile Co.	a	1881 S. 1st St., San Jose	San Jose
Stanislaus County			
Coopertown Clay Deposit, J. H. Hornsby	c	651 Cumberland St., Pittsburg	Coopertown
Tulare County			
San Joaquin Materials Co.	b	744 G St., Fresno	Exeter
Ventura County			
Peoples Lumber Co., C. E. Bonestel, Mgr.	a, b, c	708 E. Meta St., Ventura	Ventura
Shell Oil Co., Dent Clay Pit	d	Shell Bldg., San Francisco	Ventura

a. Clay products. b. Brick and hollow building tile. c. Crude clay. d. Oil-well drilling-mud. e. Filtering clay.

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COAL

Operator	Address	Location of mine
Amador County		
Buena Vista Coal Mining Co., J. J. Morras, Supt.	Ione, c/o R.F.D.	Buena Vista
Monterey County		
Monterey Coal Corp.*	111 Sutter St., San Francisco	Stone Canyon
Trinity County		
Thomas E. Reese	Douglas City	Douglas City

*Now abandoned.

COPPER

Principal Copper Producers in California in 1935

Mine	Operator	Address	Location of mine
Alameda County			
Alma	Blowski Copper Co.	1328 Trestle Glen, Oakland	Leona Heights
Inyo County			
Cardinal	Cardinal Gold Mining Co., Bin D. Bishop	972 S. 4th St., Los Angeles	Keeler
Nevada County			
Empire North Star Pennsylvania	Empire Star Mines Co., Inc.	14 Wall St., New York, N. Y.	Grass Valley
Empress	Republic Gold Mining Corp.	Box 914, Grass Valley	Grass Valley
Lava Cap	Lava Cap Gold Mining Corp.	Box 780, Grass Valley	Grass Valley
San Juan	Bradley Mining Co.	Crocker Bldg., San Francisco	North San Juan
Spanish	San Francisco Commercial Co.	Crocker Bldg., San Francisco	Washington
Plumas County			
Walker	Walker Mining Co.	818 Kearns Bldg., Salt Lake City, Utah	Walker Mine

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DIATOMITE (DIATOMACEOUS EARTH)

Operator	Address	Location of quarry or mine
Fresno County		
Mineral Products Mfg. Co., T. H. Elliott and L. J. Allen	3464 Ventura St., Fresno	Mendota
A. P. Shepard	3101 Mariposa St., Fresno	Mendota
Los Angeles County		
The Dicalite Co.	756 S. Broadway, Los Angeles	San Pedro
Raylite Aggregates, Inc., W. M. Sutherland, Pres.	1106 Detwiler Bldg., Los Angeles	Palos Verdes
Monterey County		
Pacatone, Ltd.	Bradley	Bradley
Santa Barbara County		
Johns Manville Products Corp.	Lompoc	Lompoc
National Silica Products Co., C. E. Miller	1201 Bryant St., Palo Alto	Lompoc

DOLOMITE

Operator	Address	Location of quarry
Inyo County		
Inyo Marble Co.	726-732 E. 29th St., Los Angeles	Keeler
Monterey County		
Pacific Coast Steel Corp., Sterling Ranch Quarry	20th and Illinois Sts., San Francisco	Natividad

FELDSPAR

Operator	Address	Location of mine
San Diego County		
Chamberlain Co., Inc.	2550 E. 9th St., Los Angeles	Jacumba
Standard Sanitary Mfg. Co., P. R. Jones, Mgr.	Campo	Campo

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GOLD

Principal Gold Producers in California out of a Total of 2,599 Placer Operators and Lode Mines in 1935

Mine	Type of mine	Operator	Address	Location of mine
Amador County				
Argonaut	a	Argonaut Mining Co., Ltd.	1404 Humboldt Bank Bldg., San Francisco	Jackson
Argonaut Tailings Dump	c	Hill & Hambric	Box 16, Jackson	Jackson
Arroyo Seco	e	Arroyo Seco Gold Dredging Co.	351 California St., San Francisco	Ione
Buena Vista	g	Lanoha Plana Hydraulic Mines Co., Alvin G. Ekel	Ione	Ione
Central Eureka	a	Central Eureka Mining Co.	111 Sutter St., San Francisco	Sutter Creek
Central Eureka Tailings Dump	c	Central Tailings Co.	564 Market St., San Francisco	Sutter Creek
Fort Ann	a	Fort Ann Mining Co., J. C. Ninno	Volcano	Volcano
Kennedy	a, c	Kennedy Mining and Milling Co.	519 California St., San Francisco	Martell
Lancha Plana	e	Lancha Plana Gold Dredging Co.	Camanche	Camanche
Original Amador	a	Original Amador Gold Mines	Amador City	Amador City
Petersen (Levezzo)	a	W. F. Petersen	Jackson	Jackson
Voorheis Dump	c	American Smelting & Refining Co.	405 Montgomery St., San Francisco	Martell
Dump of all old mines near Ione	c	Delta Tailings Co.	564 Market St., San Francisco	Ione
Butte County				
Biggs	e	Yuba Consolidated Gold Fields	351 California St., San Francisco	Rio Bonita
Casod Ranch	h	L. H. Kryer	Oroville	Oroville
Cinco	h	Cinco Mineros Co.	Box 212, Oroville	Oroville
Gianella	h	Olsen & Kronquest	Richvale	Richvale
Hintz	k	A. C. O'Neal	52 N. E. Tillamook St., Portland, Ore.	Big Butte Creek
Hintz	k	Clarence Young	Oaks Hotel, Chico	Big Butte Creek
Las Plumas (Surcease)	a	Hoefling Bros., Inc.	1000 4th St., Sacramento	Yankee Hill
New Era	f	J. O. Gaumer	R.F.D. 1, Oroville	Oroville
Palermo	e	Palermo Dredging Co.	Oroville	Oroville
Sadie King	h	Lord & Bishop	Native Sons Bldg., Sacramento	Oroville
Thurman Hill	e	Oroville Gold Dredging Co.	Box 86, Oroville	Oroville
Jack Welch	h	Laurence Neal	Oroville	Oroville
Wyandotte Creek	h	Wyandotte Gold Dredging Co., H. G. English, Mgr.	Box 3, Oroville	Oroville
Calaveras County				
Boston	a	Boston Mokelumne Mining Co., F. C. Moore, Supt.	Mokelumne Hill	Mokelumne Hill
Bright Star	a	Russell Gold Mining Co.	Angels Camp	Angels Camp
Calaveras	a	Mar John Mines Co., P. B. Russell, Supt.	Sheep Ranch	Sheep Ranch

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Calaveras Central	f	Calaveras Central Gold Mining Co., Ltd.	58 Sutter St., San Francisco	Angels Camp
Calaveras Columbus	a	Woodhouse Mining Co.	112 Market St., San Francisco	West Point
Carson Hill	a	Carson Hill Gold Mine Corp.	Sonora	Melons
Camanche Placers	e	Camanche Placers, Inc.	Camanche	Camanche
Easy Bird	a	Lucky Joe Gold Mining Co.	Box 292, Jackson	San Andreas
Foster Ranch	e	Comanche Gold Dredging Co.	311 California St., San Francisco	Camanche
Golden River (Bishop)	f	Golden River Mining Co.	Trans-America Bldg., Los Angeles	Angels Camp
Lloyd	f	Charles W. Neilsen	San Andreas	San Andreas
Plug Ugly	f	Buck Bros.	San Andreas	San Andreas
Royal	a	Frank S. Tower	Milton	Milton
Sand Pit	k	Gold Gravel Producers, Inc.	Wallace	Wallace
South Gulch	h	E. L. Lilly	1844 Carmel Ave., Stockton	Jenny Lind
South Gulch & Clear Creek	h	Milton Gold Dredging Enterprise, K. G. Schwigler	405 Montgomery St., San Francisco	Milton
Vallecito Western	f	Tonopah Belmont Dev. Co.	Angels Camp	Angels Camp
El Dorado County				
Beebe	a	The Beebe Gold Mining Co.	Crocker Bldg., San Francisco	Georgetown
Black Oak	a	Russell J. & Edwin W. Wilson	Garden Valley	Garden Valley
Big Canyon	a	The Mountain Copper Co., Ltd.	351 California St., San Francisco	Shingle
Blue Rock	e	Canyon Creek Dredge, J. E. Croudace, trustee	Russ Bldg., San Francisco	Georgetown
Briarcliffe	a	Briarcliffe Mines, Ltd.	Box 156, Plymouth	Plymouth
Carpender	f	M. A. McGinley	Biltmore Hotel, Los Angeles	Placerville
Gold Reserve	a	George W. Peltier	c/o Bank of America, 8th and J Sts., Sacramento	Placerville
Kelsey	a	Kelsey Mining Co., Inc.	519 California St., San Francisco	Placerville
Landecker	f	P. B. Butler et al.	426 S. Roxberry Dr., Beverly Hills	Placerville
Lookout	d	Lloyd E. Hill and P. J. Lovless	El Dorado	El Dorado
Montezuma	a	Montezuma-Apex Mining Co.	Box M, Placerville	Placerville
River Bar Lotus	b	Placers, Inc., R. A. Healy	Placerville	Lotus
Slinger	a	Middle Fork Gold Mining Co.	Box M, Auburn	Greenwood
Fresno County				
Grant Service Gravel Pit	h	Grant Service Rock Co.	509 T. W. Patterson Bldg., Fresno	Friant
Humboldt County				
Pearch	g	P. L. Young	Orleans	Orleans
Imperial County				
Cargo Muchacho	a	Holmes & Nicholson Mining & Milling Co.	Box 828, Yuma, Ariz.	Ogilby
Tumco	a	Riggs & Horgan	Ogilby	Ogilby
Inyo County				
Cardinal	a	Cardinal Gold Mining Co.	Bin D., Bishop	Bishop Creek
Gold Dust	a	Keeler Gold Mines, Inc.	972 S. 4th St., Los Angeles	Keeler
Golden Treasure	a	Golden Treasure Mines, Inc.	5410 Wilshire Blvd., Los Angeles	Shoshone
Orondo	f	The Orondo Mines Co.	1028 S. Wall St., Los Angeles	Trona
Reward (Brown Monster)	a	Inyo Mines, Inc.	Yermo	Yermo
Silver Ball	a	Gray & Worcester Mining Co.	Beatty, Nev.	Death Valley

a. Lode gold mine. b. Placer (sluicing) mines. c. Tailings dumps. d. Pocket. e. Dredge (bucket line). f. Drift mine. g. Hydraulic mine. h. Dragline dredge. k. Power shovel. j. Copper-gold mine. l. Silver-gold mine.

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GOLD—Continued

Principal Gold Producers in California out of a Total of 2,599 Placer Operators and Lode Mines in 1935

Mine	Type of mine	Operator	Address	Location of mine
Kern County				
Big Blue	a	Big Blue Mining Co.	Kernville	Kernville
Big Butte	a	Butte Lode Mining Co., E. L. Wegmann	Randsburg	Randsburg
Big Dike	a	Anglo American Mining Co.	Mills Bldg., San Francisco	Randsburg
Buckboard & Baltic	a	E. P. Ferry	308 E. Lomita St., Glendale	Randsburg
Drunkards Dream	a	J. C. Watser et al.	409 18th St., Bakersfield	Caliente
Elephant-Gray Eagle	a	Elephant-Eagle Mines and 17 Lessees	Bank of America Bldg., Los Angeles	Soledad Mountain
Middle Butte	a	Burton & Brite	Rosamond	Mojave
Minnehaha	a	E. B. Maginnis et al.	Box 228, Randsburg	Randsburg
Silver Queen	a	Golden Queen Mining Co.	Mojave	Mojave
Soledad Extension	a	Soledad Mojave Mining Co.	Mojave	Mojave
Tropico	a	Burton Bros., Inc.	Rosamond	Rosamond
Yellow-Aster	a	Anglo American Mining Corp.	Mills Bldg., San Francisco	Randsburg
Los Angeles County				
Allison	a	V. F. Kirchoff	151 N. Florence St., Burbank	Azusa
Big Horn	a	Big Horn Mine Co.	610 Brisbane Bldg., Buffalo, N. Y.	Valyermo
Big Susanna	a	Rogers & Gentry	Fairmont	Fairmont
Boquet Canyon	b	Soledad Placer Co.	726 Washington Bldg., Los Angeles	Boquet Canyon
Governor	a	Governor Mining Co.	729 Figueroa St., Los Angeles	Frazier Park
Valview	a	Ventura-Neenach Mining Co., et al.	Lancaster	Lancaster
Madera County				
Enterprise	a	P. H. Collins	Raymond	Ahwahnee
Mariposa County				
Diltz	a	E. R. Baker et al.	1518 14th St., Sacramento	Whitlock
Doss	a	Doss Mining Co.	Matson Bldg., San Francisco	Hornitos
Ferguson	a	Original Mining & Milling Co.	510 18th St., Merced	Incline
French	a	C. C. Baker	Bear Valley	Bear Valley
Pine Tree and Josephine	a	Pacific Mining Co., A. V. Udell, Mgr.	Crocker Bldg., San Francisco	Bear Valley
Ruth Pierce	a	Ernest L. Buerki	Hornitos	Hornitos
Schroeder	a	Pehrson, Rodgers & Pehrson	Mariposa	Mariposa
Merced County				
Kelsey Ranch	k	Frank B. Marks	Newman	Merced Falls
Kelsey Ranch	h	Kramer & Arnold	Box 25, Merced	Merced Falls
Merced	c	Merced Dredging Co.	Mills Bldg., San Francisco	Snelling
Merced Unit	e	Yuba Consolidated Gold Fields	351 California St., San Francisco	Snelling
Snelling	e	Snelling Gold Dredging Co.	Snelling	Snelling

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Mono County				
Casa Diablo	a	James Birchun and E. H. Peterson	Laws	Bodie
Standard	a	J. S. Cain	Bodie	Bodie
Nevada County				
Ancho Eric	a	Ancho Eric Gold Mining Co., F. M. Cole, Mgr.	Graniteville	Graniteville
Empire, Pennsylvania, North Star, Murchie, and Zeibright	a	Empire Star Mines Co., Inc.	14 Wall St., Room 1507, New York, N. Y.	Grass Valley
Empress	a	Republic Gold Mining Corp.	Box 914, Grass Valley	Grass Valley
Frederic	a	Wiljobar Corp.	70 Pine St., New York	Nevada City
Golden Center and Scotia	a	Cooley Butler	Rowan Bldg., Los Angeles	Grass Valley
Hoge	a	Great Northern Gold Mines	310 Broad St., New York	Nevada City
Idaho-Maryland	a	Idaho-Maryland Mines Corp., Errol McBoyle, Mgr.	Russ Bldg., San Francisco	Grass Valley
Jim	a	Jim Consolidated Mining Co., Ltd., Ed Columbus, Pres.	Story Bldg., Los Angeles	Graniteville
Lava Cap	a	Lava Cap Gold Mining Corp.	Box 780, Nevada City	Nevada City
Liberty Hill	g	Liberty Hill Gold Mining Co.	287 Outpost Bldg., Los Angeles	Dutch Flat
Manzanita	f	Graham Bros., W. S. Graham	Nevada City	Nevada City
MacDonald Tailings	c	Ernest Wm. Ellis	143 Poco St., Grass Valley	Grass Valley
Prood	g	Bigelow Bros. & Paul J. Dudley	North Columbia	No. Columbia
Queen Lil	a	C. L. Rockefellow	Washington	Washington
Ragon	a	California Sierra Gold Mines, Inc.	108½ Pine St., Nevada City	Nevada City
Relief Hill	g	Western Gold, Inc.	Russ Bldg., San Francisco	Washington
San Juan	a	Bradley Mining Co.	Crocker Bldg., San Francisco	North San Juan
Spanish	a	San Francisco Commercial Co.	Crocker Bldg., San Francisco	Washington
Spring Hill	a	Spring Hill Gold Mines, Inc.	Mills Bldg., San Francisco	Grass Valley
You Bet	g	You Bet Mining Co.	Box 906, Grass Valley	Dutch Flat
Placer County				
Alabama	a	Alabama California Gold Mines Co.	Box 155, Auburn	Penryn
Allens	h	Pantle Bros. & E. B. Skeels	190 Orange St., Auburn	Loomis
American Bar	a	Industrial Eng. & Equipment Corp., L. E. Weisenburg, V. Pres.	Title Guarantee Bldg., Los Angeles	Michigan Bluff
Auburn Chicago	a	Auburn-Chicago Mines Corp.	Citizens Nat'l Bank Bldg., Los Angeles	Penryn
Clarke Ranch	k	Charles N. Chittenden	Lincoln	Lincoln
Dairy Farm	a	Dairy Farm Gold Corp.	Box 326, Lincoln	Lincoln
Fay Placer	h	E. M. Kaunfied	Box 274, Lincoln	Lincoln
Gleason	f	E. C. Schwab	Iowa Hill	Iowa Hill
Home Ticket	f	Black Bear Consolidated Mining Co., O. O. Evans	Mills Bldg., San Francisco	Michigan Bluff
Mary Len	a	H. R. Owen et al.	Penryn	Penryn
Nisson	h	Virginia Placer Co.	Lincoln	Lincoln
Oakwood	h	Oakwood Placer Mining Co.	Lincoln	Lincoln
Oro Bell	e	Oro Bell Dredging Co.	Box 1051, Sacramento	Gold Pen
Paragon	g	Rosenberg & Gillette, King G. Gillette	1803 Winona Blvd., Hollywood	Forest Hill
Person Placer	h	Placers, Inc.	915 Rives Strong Bldg., Los Angeles	

a. Lode gold mine. b. Placer (sluicing) mines. c. Tailings dumps. d. Pocket. e. Dredge (bucket line). f. Drift mine. g. Hydraulic mine. h. Dragline dredge. k. Power shovel. j. Copper-gold mine. l. Silver-gold mine.

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GOLD—Continued

Principal Gold Producers in California out of a Total of 2,599 Placer Operators and Lode Mines in 1935

Mine	Type of mine	Operator	Address	Location of mine
Placer County—Continued				
Rawhide	a	Canyon Mines Corp.	144 Kearny St., San Francisco	Dutch Flat
Recalp	h	Jasper-Stacy Co., trustee	216 Pine St., San Francisco	Lincoln
Ross	h	E. B. Skeels	190 Orange St., Auburn	Auburn
Three Queens	a	J. T. Boyd	Placerville	Forest Hill
T W A	a	T W A Mines, Inc.	H. W. Hellman Bldg., Los Angeles	Auburn
Wortell Ranch	h	Lincoln Gold Dredging Co.	Box 334, Lincoln	Lincoln
Plumas County				
Mary Ann	a	R. A. Vermillian & Geo. D. French	1001 E. Slauson Ave., Los Angeles	La Porte
Walker	j	Walker Mining Co.	818 Kearns Bldg., Salt Lake City, Utah	Walkermine
Riverside County				
Ducky Boy	a	E. Auclair	Box 35, Twenty-nine Palms	Twenty-nine Palms
Gold Crown & Nightingale	a	Gold Crown Mining Co., Ltd.	730 Petroleum Securities Bldg., Los Angeles	Twenty-nine Palms
Red Cloud	a	S. & W. Mine Development Co., B. F. Schmidt	2250 Crenshaw Bldg., Los Angeles	Mecca
Sacramento County				
Capitol	e	Capital Dredging Co.	351 California St., San Francisco	Folsom
Natoma	e	Natomas Co.	Forum Bldg., Sacramento	Natoma
Willow Hill	e	Gold Hill Dredging Co.	311 California St., San Francisco	Folsom
San Bernardino County				
Atolia-Rand Placers	b	Atolia-Rand Placers, Inc.	215 W. 5th St., Los Angeles	Atolia
Brannigan	a	Butler & Roper	Box 231, Mecca	Mecca
Coyote	l	C. O. Mittendorf	Red Mountain	Red Mountain
Kelly	a	Kelly Gold & Silver Mines, Inc., Frank W. Roper	606 Hill St., Los Angeles	Randsburg
Orando	b	The Orando Mines	6th and D Sts., San Bernardino	
Supply	a	Supply Mining Co., Lessor	536 Hill St., Los Angeles	Twenty-nine Palms
Vanderbilt	a	Atascadero Mining Co.	Atascadero	Ivanpah
Vulcan	a	John M. Fink	Amboy	Amboy
San Joaquin County				
Mikes Gulch	h	Kumle & Ferris	Le Grand	Clements
Shasta County				
Dry Creek	h	Midland Co.	733 Dwight Way, Berkeley	Cottonwood
Iron Mountain	a	The Mountain Copper Co., Ltd.	351 California St., San Francisco	Matheson
Milk Maid	a	J. H. Scott Co.	Merchants Exchange Bldg., San Francisco	French Gulch
Tiler	h	Pyoneer Gold Dredging Co.	Redding	Redding
Yankee John	a	Rich Strike Gold Mine, Inc.	Box 309, Redding	Redding

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Sierra County				
Depot Hill	g	F. J. Joubert	Comptonville	Comptonville
Kenton	a	Gamble & Wilson	Alleghany	Alleghany
Original 16 to 1 and Tightner	a	Original 16 to 1 Mines, Inc.	Russ Bldg., San Francisco	Alleghany
Ruby	a	C. L. Best	800 Davis St., San Leandro	Forest
Siskiyou County				
Cal Oro	e	Cal Oro Dredging Co.	681 Market St., San Francisco	Yreka
Gold Ball	a	Gold Ball Mining Co.	Sawyers Bar	Sawyers Bar
King Solomon	a	King Solomon Mines Co.	Crocker Bldg., San Francisco	Black Bear
Little Daisy	f	W. E. Hittson	Jacksonville	Elliott Creek
McConnell Bar	k	Klamath Placer Mining Co., W. D. Miller	Klamath Falls, Ore.	Yreka
Morrison & Carlock	a	Northern California Gold Fields, Inc.	723 Second St., Seattle, Wash.	Etna
Mt. Vernon	a	Kenneth K. Ash	Box 916, Yreka	Yreka
Quartz Hill	g	Noonan & Milne, Geo. C. Noonan	Scotts Bar	Fort Jones
Turk	a	Banks & Maginnis, Inc.	Fort Jones	Fort Jones
Stanislaus County				
La Grange	e	La Grange Gold Dredging Co.	Mills Bldg., San Francisco	La Grange
Trinity County				
Bank	g	C. O. Arbuckle	Weaverville	Weaverville
Brown Bear	a	Brown Bear Mines Corp.	Lewiston	Lewiston
Canyon Placers	g	Canyon Placers, Inc.	Dedrick	Dedrick
Enterprise	a	Chiksan Oil Co.	Chapman Bldg., Fullerton	Weaverville
Gold Bar	e	Gold Bar Dredging Corp., H. Dolson, Pres.	Box 103, Lewiston	Lewiston
Golden Jubilee	a	Trinity Gold Mines, Inc.	654 Colman Bldg., Seattle, Wash.	Carrville
Osborn Hill	g	M. R. K. Mining Co., W. O. Kinsman	Helena	Helena
Redding Creek	g	Redding Creek Placers, Ltd., J. H. Atkins, Sec.-Treas.	823 J St., Sacramento	Douglas City
Red Hill	g	Northern California Mining Co., J. A. Gilzean, Supt.	Crocker First Nat'l Bldg., San Francisco	Junction City
Tangle Blue	a	Grand National Mining Co.	Callahan	Callahan
Trinity	e	Trinity Dredging Co., Mary E. Smith, Mgr.	Lewiston	Lewiston
Tuolumne County				
Columbus	a	Columbus Gold Mining Co.	1 Montgomery St., San Francisco	Tuolumne
Draper	a	Draper Vein Syndicate	111 Sutter St., San Francisco	Soulsbyville
Golden Crescent	b	Ted Jamieson	Nevada City	
Hard to Find	d	J. L. McPherson & H. D. Nead	Sonora	Sonora
Heslop	a	Quartz Hill Mining Co.	332 Pine St., San Francisco	Jamestown
Hickcock	a	Will Halloran	Jamestown	Jamestown
Little Bonanza	d	Alfred Barlow & Jack Lawson	Sonora	Sonora
Soulsby Belle	a	Soulsby Belle Mining Co.	15th and Vine Sts., Kansas City, Mo.	Soulsbyville
Yuba County				
Archimedes	h	Archimedes Gold Dredging Co., F. N. Peyton	Box 1046, Marysville	Smartville
Blue Paint	f	Gold Exploration Mining Co.	Walker Bank Bldg., Salt Lake City, Utah	Smartville
Poverty Hill	a	Poverty Hill Mine	Strawberry Valley	Strawberry Valley
Templer	a	Templer Mining Co., T. J. Williams	Capitol Nat'l Bank Bldg., Sacramento	Dobbins
Yuba	e	Yuba Consolidated Gold Fields	351 California St., San Francisco	Hammonton
----------	g	Sierra Gold Dredging Co.	Merchants Exchange Bldg., San Francisco	Dobbins

a. Lode gold mine. b. Placer (sluicing) mines. c. Tailings dumps. d. Pocket. e. Dredge (bucket line). f. Drift mine. g. Hydraulic mine. h. Dragline dredge. k. Power shovel. j. Copper-gold mine. l. Silver-gold mine.

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GRANITE

Operator	Product	Address	Location of quarry
Fresno County			
Academy Granite	a	Clovis	Clovis
Superior Granite Co., Inc.	a	Clovis	Academy
Lassen County			
A. D. Greig, Greig Quarry	a	Susanville	Susanville
Madera County			
Kingsland Granite Co.	a	Box 156, Madera	Bates Station
McGilvray Raymond Corp.	a	3 Potrero Ave., San Francisco	Raymond
Mariposa County			
Yosemite National Park	a	Yosemite	Yosemite Park
Nevada County			
Netz Granite Quarry, Ludwig Netz	a	Nevada City	Nevada City
Placer County			
Victor Wickman	a	Rocklin	Rocklin
Plumas County			
Paul Sonognini	a	Chilcoot	Chilcoot
Sacramento County			
Folsom State Prison	a	Represa	Represa
San Diego County			
American Marble & Granite Works	a	1212 E. 9th St., Los Angelesz	Santee
Crystal Black Quarry, John Stridsburg	a	Escondido	Spooks Canyon
Matson & Deering, Meyers Quarry	a	Lakeside	Lakeside
McGilvray-Raymond Corp., Lakeside Quarry	a	678 S. Anderson St., Los Angeles	Lakeside
Sonoma County			
S. Cabrol	b	Glen Ellen	Glen Ellen
L. R. DeChesne	c	Glen Ellen	Glen Ellen
Ernest Laurent	b, c	Kenwood	Kenwood
Tulare County			
Sequoia Nat'l Park	a	Three Rivers	Sequoia Nat'l Park
Ventura County			
Ritchie Bros., R. A. Ritchie and J. A. Ritchie	c	Fillmore	Grimes Canyon

a. Granite used in building and monumental stone. b. Tuff used as building stone. c. Volcanic rock used as flagstone.

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GRAPHITE

Operator	Address	Location of plant
Los Angeles County		
Western Graphite Co.	337 W. Ave. 26, Los Angeles	Lake Hughes

GYPSUM

Operator	Address	Location of quarry
Fresno County		
Dos Palos Gypsum Co., O. L. Divens and A. A. Conrowe	Dos Palos	S. Dos Palos
Green & Collins	Ceres	Mendota
Paoli Gypsum Mine, A. P. Shepard, Mgr.	3101 Mariposa St., Fresno	Mendota
Imperial County		
Imperial Gypsum Quarry, Pac. Portland Cement	111 Sutter St., San Francisco	Plaster City
Riverside County		
U. S. Gypsum Co.	300 W. Adams St., Chicago, Ill.	Midland

IODINE

Operator	Address	Mine
Los Angeles County		
I. O. Dow Chemical Co.	310 Santiago Ave., Long Beach	Long Beach

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IRON

Mine	Operator	Address	Location of mine
San Bernardino County			
Cave Canyon	A. S. Vinell Co.	969 Amelia Ave., Los Angeles	Baxter
Iron Hat Group	Tom Schofield	Cadiz	Cadiz

LEAD

Principal Lead Producers in California in 1935

Mine	Operator	Address	Location of mine
Inyo County			
Carbonate	John P. Madison & H. L. Hillwig	490 Post St., San Francisco	Shoshone
Contac No. 7	B. M. & C. E. Clay	Chloride Cliffs, via Beatty, Nevada	Chloride Cliff
Custer	J. C. & John F. Baxter	Independence	Owenyo
Estelle & Cerro Gordo	Estelle Mines Corp.	972 S. 4th St., Los Angeles	Keeler
Estelle & Cerro Gordo	Silver Lead Syndicate	502 Scott Bldg., Salt Lake City, Utah	Keeler
Leary	F. R. Long, Inc.	Richfield Bldg., Los Angeles	Keeler
Santa Rosa	Santa Rosa Mines & Development Co., J. R. LeCyr	Keeler	Keeler
----------	J. W. Austin	Keeler	Keeler
----------	Sierra Talc Co., Franklin Booth, Mgr.	428 Union League Bldg., Los Angeles	Keeler
Nevada County			
Empire North Star Pennsylvania & Zeilbright	Empire Star Mines Co., Inc.	14 Wall St., New York, N. Y.	Grass Valley
Empress	Republic Gold Mining Corp.	Box 914, Grass Valley	Grass Valley
Lava Cap	Lava Cap Gold Mining Corp.	Box 780, Nevada City	Nevada City
Spanish	San Francisco Commercial Co.	Crocker Bldg., San Francisco	Washington
Orange County			
Blue Light	Hughes Mitchell Processes Co.	Box 147, Torrance	Silverado
Riverside County			
Black Eagle	Eagle Mining & Refining Co.	453 S. Spring St., Los Angeles	Coachilla
San Bernardino County			
Burcham	Maurice Mulcahy	Daggett	Daggett

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Operator	Product	Address	Location of quarry
Alameda County			
California Chemical Co.	a, d	Mills Tower, San Francisco	Newark
El Dorado County			
Auburn Chemical Lime Co., Ltd.	a, b	Auburn	Newcastle
Diamond Springs Lime Co.	a, b, c	Diamond Springs	Diamond Springs
El Dorado Limestone Co., J. H. Bell, Mgr.	b, c	Shingle Springs	Shingle Springs
Pac. Portland Cement Co., Cons.	b	111 Sutter St., San Francisco	Auburn
Fresno County			
Coral Reef Lime Corp., B. F. Mason, Mgr.	c, e	Dinuba	Reedley
San Bernardino County			
Cal. Portland Cement Co.	a	1228 Pac. Mutual Bldg., Los Angeles	Colton
Chubbuck Lime Co., Chas. I. Chubbuck	a, b, c	5000 Worth St., Los Angeles	Chubbuck
Victorville Lime Rock Co.	b	356 S. Mission Rd., Los Angeles	Victorville
San Mateo County			
Pacific Portland Cement Co.	c, d	111 Sutter St., San Francisco	San Mateo
Santa Clara County			
Bay Shell Co.	c, d	503 Market St., San Francisco	Alviso
L. H. Beck	c, d	P.O. Box 113, Colma	Alviso
W. B. Ortley Shell Co.	c, d	Alviso	Alviso
Santa Cruz County			
Henry Cowell Lime and Cement Co., W. H. George, Mgr.	a, b	2 Market St., San Francisco	Santa Cruz
Holmes Lime & Cement Co.	a	Division and De Haro Sts., San Francisco	Felton
Pacific Limestone Prod. Co.	b	Spring St., Santa Cruz	Santa Cruz
Tuolumne County			
McLean Quarry, W. S. McLean	b	419 Bayshore Blvd., San Francisco	McLean Spur
U. S. Lime Products Corp.	a, b	85 2d St., San Francisco	Sonora

a. Producer of burnt lime. b. Producer of limestone. c. Agricultural lime. d. Shells. e. Marl.

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MAGNESITE

Operator	Address	Location of mine
Santa Clara County		
California Chemical Co., lessee, Western Magnesite Mine	Mills Tower, San Francisco	Red Mountain
Stanislaus County		
California Chemical Co., Bald Eagle Mine	Mills Tower, San Francisco	Gustine

MAGNESIUM SALTS

Operator	Product	Address	Location of plant
San Diego County			
California Chemical Co.	Chloride	Mills Tower, San Francisco	San Diego
San Mateo County			
Marine Chemical Co., R. E. Clarke	Carbonate	South San Francisco	South San Francisco
Plant Rubber & Asbestos Works	Carbonate	537 Brannan St., San Francisco	Redwood City

MANGANESE ORE

Operator	Address	Location of mine
Riverside County		
Bradley & Ekstrom Langdon Mine	320 Market St., San Francisco	Midland

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MARBLE (including Onyx and Travertine)

Operator	Product	Address	Location of quarry
Santa Cruz County			
Pacific Limestone Prod. Co.	b	Santa Cruz	Santa Cruz
Solano County			
P. Grassi & Co.	c	1945 San Bruno Ave., San Francisco	Cement
Tolenas Springs Onyx, L. Cardini	c	121 14th St., San Francisco	Tolenas Springs
Tuolumne County			
The Columbia Marble Co., R. H. Van Norden, Secy.	a	413 Rialto Bldg., San Francisco	Columbia

a. Marble. b. Limestone. c. Onyx and travertine.

MICA

Operator	Address	Location of property
Imperial County		
Micatalc Co.	1557 Courtney Ave., Hollywood, Cal.	Ogilby

MINERAL PAINT

Operator	Address	Location of property
Placer County		
Synthetic Iron Color Co.	Richmond	Forest Hill

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MINERAL WATER

Operator	Address	Location of spring
Butte County		
Feather River Canyon Spring Water Co., R. E. Chappell	2215 L St., Sacramento	Pulga
Richardson Springs, Lee Richardson, Mgr.	Chico	Chico
Calaveras County		
Mok-Hill Mineral Springs, L. Walkmeister	Sutter Creek	Sutter Creek
Contra Costa County		
Alhambra Water Co.	Martinez	Martinez
El Dorado County		
Digger Indian Natural Medicinal Water Co.	Randall	Randall
Lake County		
Adams Mineral Springs, Clarence Prather	Adams, via Middletown	Adams
Bartlett Spring Co.	681 Geary St., San Francisco	Bartlett Springs
Norman Mineral Springs, H. C. Norman, Mgr.	Middletown	Middletown
Witter Mineral Springs, W. E. Whitaker	995 Market St., San Francisco	Witter Springs
Los Angeles County		
Cascade Water Co.	4556 York Blvd., Los Angeles	Los Angeles
Elysian Spring Water Co.	1536 Baxter, Los Angeles	Los Angeles
Holly Spring Water	2298 Holly Dr., Los Angeles	Los Angeles
Magnetic Spring Water Co.	936 Palm Ave., Sherman	Los Angeles
Mission Spring Water Co.	8938 Keith, Hollywood	Hollywood
Pure-lax Mineral Water Co.	3640 Griffin, Los Angeles	Los Angeles
Sparklett Drinking Water Co.	4500 York Blvd., Los Angeles	Los Angeles
Tarzana Mineral Water Co.	1485 N. Vine	Los Angeles
Marin County		
Purity Spring Water Co.	2032 Kearny St., San Francisco	Sausalito
Napa County		
Calistoga Bottling Works, E. E. Hardies	Calistoga	Calistoga
Napa Soda Springs, G. H. T. Jackson	7 Front St., San Francisco	Napa
Samuels Soda Spring, Mrs. Robert J. Little	Monticello	Monticello
Orange County		
La Vida Mineral Water Co.	804 Spring Arcade Bldg., Los Angeles	Carbon Canyon
Riverside County		
Beulah Springs, Oscar C. McNicholl	Arlington	Arlington
San Bernardino County		
Arrowhead Hot Springs, California Cons. Water Co.	1566 E. Washington Blvd., Los Angeles	Arrowhead

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San Diego County		
Rock Springs Co., E. S. Walck	Rt. 2, Box 442, Escondido	Escondido
San Diego Ice & Cold Storage Co.	67 8th St., San Diego	
San Francisco County		
Blue Crest Beverage Co.	615 Excelsior Ave., San Francisco	San Francisco
Diamond Rock Spring Water Co., L. Paolinelli	247 Naples St., San Francisco	San Francisco
San Luis Obispo County		
Crystal Spring Water Co., W. R. Hudson	R.F.D. 2, Box 11, San Luis Obispo	San Luis Obispo
Superior Spring Water Co.	c/o Sandercock Trans. Co., San Luis Obispo	San Luis Obispo
Santa Barbara County		
Veronica Mineral Springs Co.	699 Brannan St., San Francisco	Santa Barbara
Siskiyou County		
The Shasta Water Co.	6th and Brannan Sts., San Francisco	Dunsmuir
Yreka Coco Cola Bottling Works, Fred J. Meamber, Prop.	Yreka	Little Shasta
Sonoma County		
Agua Caliente Springs Co., T. H. Corcoran, Prop.	Agua Caliente	Agua Caliente
Barcal Springs, John Kolling	Preston	Preston
Fetters Mineral Springs, George Fetters	Fetters Springs	Fetters Springs

PLATINUM

Principal Platinum Producers in California in 1935

Operator	Address	Location of mine
Merced County		
Merced Dredging Co.B	Mills Bldg., San Francisco	Snelling
Yuba Consolidated Gold Fields B	351 California St., San Francisco	Snelling
Sacramento County		
Capital Dredging Co.B	Balfour Bldg., San Francisco	Folsom
Gold Hill Dredging Co.A	311 California St., San Francisco	Folsom
Natomas Co.A	Forum Bldg., Sacramento	Natomas
Stanislaus County		
La Grange Gold Dredging Co. B	Mills Bldg., San Francisco	La Grange
Yuba County		
Yuba Consolidated Gold Fields B	351 California St., San Francisco	Hammonton

A Produced and sold. B Produced but not sold.

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POTASH

Operator	Address	Location of plant
San Bernardino County		
American Potash and Chemical Co.	Trona	Trona

PUMICE OR VOLCANIC ASH

Operator	Product	Address	Location of quarry
Imperial County			
Chamberlain Co., Inc.	a	2550 E. Ninth St., Los Angeles	Calipatria
Inyo County			
Chas. Brown	a	Shoshone	Shoshone
Little Lake Pumice Co.	a	4232 S. Produce Pl., Los Angeles	Coso Junction
Tonopah & Tidewater Ry.	b	1014 Central Bldg., Los Angeles	Shoshone
Kern County			
Cudahy Packing Co.	b	803 Macy St., Los Angeles	Ceneda
Madera County			
Bennet & Jordan*	b	Box 283, Selma	Friant
Friant Pumicite Co., Earl R. Carper	b	816 Pacific Southwest Bldg., Fresno	Friant
Mono County			
California Quarries Corp.	a	1300 Quinby Bldg., Los Angeles	Laws
Napa County			
Pearl Pumice Quarries, Jas. H. Pearl	a	565 Monticello Rd., Napa	Monticello
San Luis Obispo County			
Gray Eagle Mine, M. L. Francis	b	Creston	Creston
Siskiyou County			
E. L. Jamerson, J. O. Miller, & Dan A. Williams	a	217 Monterey St., Salinas	Mount Shasta

a. Pumice. b. Volcanic Ash.
* Now operated by Friant Pumicite Co.

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PYRITE

Operator	Address	Location of mine
Alameda County		
Leona Chemical Co., D. A. McDonnell	Syndicate Bldg., Oakland	Leona Heights
Shasta County		
Mountain Copper Co., Wm. F. Kett, Mgr.	112 Market St., San Francisco	Matheson

QUICKSILVER

Principal Quicksilver Producers in California for 1935 out of a Total of 66 Operating Properties

Mine	Operator	Address	Location of mine
Inyo County			
Coso Hot Springs	J. F. Sanders	Little Lake	Coso
Kings County			
Frediana	Frediana Mining Co., E. K. Anderson, Mgr.	Parkfield	Parkfield
Lake County			
Great Western	Bumsted Mining Co., E. J. Bumsted, Mgr.	Middletown	Middletown
Helen	L. S. Peterson	Middletown	Middletown
Mirabel	Mirabel Quicksilver Co.	Middletown	Middletown
Red Elephant	Big Six Mining Co., C. P. Morecy	Box 211, Calistoga	Reiff
Sulphur Bank	Sulphur Bank Syndicate, W. Bradley, Mgr.	Crocker Bldg., San Francisco	Lower Lake
Monterey County			
Dawson Pit	Frank Coerlla	Parkfield	Parkfield
Napa County			
Aetna	E. W. Erickson	Middletown	Aetna Springs
Knoxville	Geo. E. Gamble	1431 Waverly St., Palo Alto	Monticello
Oat Hill	Oat Hill Mine, Inc., Norman B. Livermore	369 Pine St., San Francisco	Aetna Springs
Switzer Property	Frank Adams	Pope Valley	Pope Valley

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QUICKSILVER—Continued

Principal Quicksilver Producers in California for 1935 out of a Total of 66 Operating Properties

Mine	Operator	Address	Location of mine
San Benito County			
Alpine	Harry A. Leonard Co.	Hollister	Hernandez
Aurora	Peter Bual	Paicines	Idria
Florence Mac Mine	Rex Smith	Hernandez	Hernandez
Idria	New Idria Quicksilver Mines, Inc.	Mer. Exch. Bldg., San Francisco	Idria
Stayton	R. B. Knox	Hollister	Hollister
San Luis Obispo County			
Klau	Klau Mine, Inc.	Pent House, Mills Bldg., San Francisco	Adelaida
Oceanic	Anglo American Mining Corp.	Mills Bldg., San Francisco	Cambria
Polar Star	E. D. Rogers	San Simeon	San Simeon
Santa Barbara County			
Lion Den	Lion Den Mercury Co., J. G. Moore	Los Olivos	Buellton
Los Prietos	Ray Wyatt	Box 277, Santa Barbara	Santa Barbara
Red Rock	Santa Ynez Mercury Co., Oscar E. Hanno, Mgr.	Solvang	Solvang
Santa Clara County			
Little Almaden	Little Almaden Mining Co.	Almaden	Almaden
New Almaden Dump	C. E. Watson Mining Co.	R.F.D. 3, Box 349, Los Gatos	Almaden
Sonoma County			
Cloverdale	Cavagnaro & Schor	Cloverdale	Cloverdale
Culver-Baer	Davey Mining Co.	Cloverdale	Cloverdale
Esperanza	Jas. G. Cortelyou	Cloverdale	Cloverdale
Trinity County			
Altoona	Altoona Quicksilver Mining Co., J. Frowenfield, Pres.	2446 Washington St., San Francisco	Castella

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Operator	Address	Location of plant
Alameda County		
Arden Salt Co.	225 Bush St., San Francisco	Newark and Mt. Eden
California et al. Plants, Leslie-California Salt Co.	110 Sansome St., San Francisco	Alvarado
Imperial County		
Imperial Salt Co.	4000 E. Washington Blvd., Los Angeles	Calipatria
Kern County		
Long Beach Salt Co.	P.O. Box 28, Long Beach	Saltdale
Los Angeles County		
Long Beach Salt Co.	P.O. Box 28, Long Beach	Long Beach
Modoc County		
Surprise Valley Salt Works, Joshua H. Hutchinson	Box 26, Cedarville	Lake City
Monterey County		
Monterey Bay Salt Co., E. C. Vierra, Mgr.	Moss Landing	Moss Landing
San Bernardino County		
California Rock-Salt Co.	2465 Hunter St., Los Angeles	Amboy
Rock Salt Products Co.	845 El Centro St., South Pasadena	Salt Marsh
San Diego County		
Western Salt Co.	917 J. D. Spreckels Bldg., San Diego	San Diego
San Mateo County		
Stauffer Chemical Co.	636 California St., San Francisco	Redwood City

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SANDSTONE

Operator	Address	Location of quarry
Los Angeles County		
Alphonso Bell Corp.	10601 Chalon Rd., Bel-Air, Los Angeles	Bel-Air
Binder Bros., W. H. Binder	285 N. Lake Ave., Pasadena	Boquet Canyon
Monterey County		
Carmel Stone Quarry, A. L. Passadori	Carmel	Carmel
Sierra Quarry, Harry Rogers	Box 136, Carmel	Carmel
Andrew Stewart	Carmel Valley	Carmel Valley
San Luis Obispo County		
Mora Bros.	Box 121, Cambria	Cambria

SILICA

Operator	Product	Address	Location of mine
Contra Costa County			
Hazel-Atlas Glass Co. of California, Ltd.	b	89th Ave. and G St., Oakland	Summerville
Silica Co. of California, Ltd.	b	405 Montgomery St., San Francisco	Brentwood
Orange County			
Arnold Clay Mine, I. P. Arnold	b	1846 W. 83d St., Los Angeles	El Toro
Placer County			
Elmore Hill Placer Mines, Mrs. A. F. W. Delius	a	Box 38, Alta	Alta
Riverside County			
P. J. Weisel, Inc.	a	La Habra	Corona
San Bernardino			
Temescal Clay Co.	c	5601 S. Boyle Ave., Los Angeles	Hicks
San Diego County			
Chamberlain Co., Inc.	a	2550 E. 9th St., Los Angeles	Jacumba
Standard Sanitary Mfg. Co., R. P. Jones, Mgr.	a	Campo	Campo

a. Quartz. b. Glass sand. c. Quartzite.

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SILIMANITE—ANDALUSITE—KYANITE GROUP

Operator	Product	Address	Location of mine
Imperial County			
Vitrefrax Corp.	Kyanite	5050 Pacific St., Vernon, Los Angeles	Ogilby
Mono County			
Champion Spark Plug Co., Ceramic Division	Andalusite	Butler Ave. and Grand Trunk R. R., Detroit, Mich.	Mocalno

SILVER

Principal Silver Producers in California in 1935

Mine	Type of mine	Operator	Address	Location of mine
Amador County				
Argonaut	a	Argonaut Mining Co., Ltd.	1404 Humboldt Bank Bldg., San Francisco	Jackson
Fort Ann	a	Fort Ann Mining Co., J. C. Ninno	Volcano	Volcano
Kennedy	a	Kennedy Mining and Milling Co.	519 California St., San Francisco	Martell
Voorheis Dump	a	American Smelting & Ref. Co.	405 Montgomery St., San Francisco	Martell
Butte County				
Las Plumas (Surcease)	a	Hoefling Bros., Inc.	1000 4th St., Sacramento	Yankee Hill
Calaveras County				
Carson Hill	a	Carson Hill Gold Mines Corp.	Sonora	Melons
El Dorado County				
Gold Reserve	a	George W. Pelton	c/o Bank of America, 8th and J Sts., Sacramento	Placerville
Montezuma	a	Montezuma Apex Mining Co.	Box M, Placerville	Placerville
Imperial County				
Cargo Muchacho	a	Holmes & Nicholson Mining & Milling Co.	Box 828, Yuma, Ariz.	Ogilby

a. Gold. b. Silver. c. Copper. d. Lead-silver. e. Gold dredge. f. Gold, silver.

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SILVER—Continued

Principal Silver Producers in California in 1935

Mine	Type of mine	Operator	Address	Location of mine
Inyo County				
Carbonate	d	John P. Madison and H. L. Hellwig	490 Post St., San Francisco	Shoshone
Cardinal	a	Cardinal Gold Mining Co., Bin D. Bishop	972 S. 4th St., Los Angeles	Bishop
Estelle & Cerro Gordo	d	Estelle Mining Corp.	972 S. 4th St., Los Angeles	Keeler
Estelle & Cerro Gordo	d	Silver Lead Syndicate	502 Scott Bldg., Salt Lake City, Utah	Keeler
Leary	d	F. R. Long, Inc.	Richfield Bldg., Los Angeles	Keeler
Santa Rosa	d	Santa Rosa Mines & Development Co., J. R. Le Cyr	Keeler	Keeler
Kern County				
Big Blue	a	Big Blue Mining Co.	Kernville	Kernville
Cactus Queen	b	Cactus Mines Co., Geo. B. Kimball	Box 418, Ojai	Fleta
Elephant Eagle	a	Elephant-Eagle Mines and 17 lessees	Bank of America Bldg., Los Angeles	Soledad Mountain
Gold Bug	f	International Mining & Milling Co.	Randsburg	Inyokern
Middle Butte	a	Burton & Brite	Rosamond	Mojave
Silver Queen	a	Golden Queen Mining Co.	Mojave	Mojave
Soledad Extension	a	Soledad Mojave Mining Co.	Mojave	Mojave
Tropico	a	Barton Bros., Inc.	Rosamond	Rosamond
Yellow Aster	a	Anglo American Mining Corp.	Mills Bldg., San Francisco	Randsburg
Los Angeles County				
Big Susanna	a	Rogers & Gentry	Fairmont	Fairmont
Valview	a	Ventura Neenach Mining Co.	Lancaster	Lancaster
Mariposa County				
Blue Moon	a	Herbert J. Kelm	914 21st St., Merced	Merced
Pine Tree & Josephine	a	Pacific Mining Co.	Crocker Bldg., San Francisco	Bear Valley
Mono County				
Silverado	b	Sierra Cons. Mines, Inc.	Sweetwater	Sweetwater
Napa County				
Palisades	b	Coast Range Mining Co.	700 La Brea Ave., Los Angeles	Calistoga

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Nevada County				
Empire, North Star	a	Empire Star Mines Co., Inc.	14 Wall St., New York, N. Y.	Grass Valley
Empress	a	Republic Gold Mining Co.	Box 914, Grass Valley	Grass Valley
Golden Center & Scotia	a	Cooley Butler	Rowan Bldg., Los Angeles	Grass Valley
Idaho Maryland	a	Idaho Maryland Mines Corp.	Russ Bldg., San Francisco	Grass Valley
Lava Cap	a	Lava Cap Gold Mining Corp.	Box 780, Nevada City	Nevada City
San Juan	a	Bradley Mining Co.	Crocker Bldg., San Francisco	North San Juan
Spanish	a	San Francisco Commercial Co.	Crocker Bldg., San Francisco	Washington
Orange County				
Blue Light	d	Hughs Mitchell Processes Co.	Box 147, Torrance	Silverado
Placer County				
Alabama	a	Alabama California Gold Mines Co.	Box 155, Auburn	Penryn
Auburn Chicago	a	Auburn Chicago Mines Corp.	Citizens Nat. Bank Bldg., Los Angeles	Penryn
Dairy Farm	a	Dairy Farm Gold Corp.	Box 326, Lincoln	Lincoln
T W A	a	T W A Mines, Inc.	H. W. Hellman Bldg., Los Angeles	Auburn
Plumas County				
Walker	c	Walker Mining Co.	818 Kearns Bldg., Salt Lake, Utah	Walkermine
San Bernardino County				
Calico Tailings	b	Lewis Warnken	Randsburg	Randsburg
Coyote	b	C. O. Mittendorf	Red Mountain	Red Mountain
Kelly	f	Kelly Gold & Silver Mines, Inc., Frank W. Roper	606 Hill St., Los Angeles	Randsburg
Santa Fe	f	Red Mountain Mining Co.	Red Mountain	Red Mountain
Sioux	b	J. B. Osborne	Daggett	Daggett
Shasta County				
Iron Mountain	a	The Mountain Copper Co., Ltd.	351 California St., San Francisco	Mathewson
Sierra County				
Original 16 to 1	a	Original 16 to 1 Mines, Inc.	Russ Bldg., San Francisco	Alleghany
Yuba County				
Yuba	e	Yuba Consolidated Gold Fields	351 California St., San Francisco	Hammonton

a. Gold. b. Silver. c. Copper. d. Lead-silver. e. Gold dredge. f. Gold, silver.

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SLATE

Operator	Product	Address	Location of quarry
El Dorado County			
Pacific Minerals Co., Ltd.		337 10th St., Richmond	Chili Bar
Inyo County			
Red Slate Quarry, J. D. Leary		Keeler	Keeler
Tuolumne County			
Whitney Slate Quarry, W. S. McLean		419 Bayshore Blvd., San Francisco	Hetch Hetchy

SOAPSTONE AND TALC

Operator	Product	Address	Location of mine
Butte County			
McLean Talc Deposit, W. S. McLean	a	419 Bayshore Blvd., San Francisco	McLean Spur
El Dorado County			
Pacific Minerals Co., Ltd., Chas. S. Renwick, Jr.	a	337 10th St., Richmond	Shrub
Inyo County			
The Glendinning Co., R. W. Glendinning	b	624 La Brea Ave., Los Angeles	Darwin
Sierra Talc Co., Franklin Booth, Mgr.	b	428 Union League Bldg., Los Angeles	Keeler
San Bernardino County			
Pacific Coast Talc Co.	b	2149 Bay St., Los Angeles	Silver Lake
Western Talc Co.	b	1901 E. Slauson Ave., Los Angeles	Acme

a. Soapstone. b. Talc.

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Operator	Product	Address	Location of plant
Inyo County			
Natural Soda Products Co.	a, b, d	650 Spring St., Los Angeles	Keeler
Pacific Alkali Co.	a	1206 Pacific Mutual Bldg., Los Angeles	Bartlett
San Bernardino County			
American Potash & Chemical Co.	a, c	Trona	Trona
Chemical Mines Co., Irving E. Bush	c	1116 Pacific Mutual Bldg., Los Angeles	Twenty-Nine Palms
West End Chemical Co.	a	706 Syndicate Bldg., Oakland	West End

a. Soda ash. b. Sodium bicarbonate. c. Salt cake. d. Trona.

STONE, MISCELLANEOUS

Under the heading of 'miscellaneous stone' there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

NOTE.—The California State Highway Commission, U. S. Bureau of Public Roads and U. S. Forest Service produce both crushed rock and sand and gravel in various places in the State used in construction and maintenance of highways, but not specified in this listing.

Operator	Product	Address	Location of pit or quarry
Alameda County			
California Rock & Gravel Co.	a	500 Call Bldg., San Francisco	Livermore
Farmers Land Co., Ltd.	a	C and 7th Sts., Hayward	Hayward
Hanifen Trucking Co.	a	Pleasanton	Pleasanton
Heafey-Moore Co., Leona Quarry	b	344 High St., Oakland	Oakland
Irvington Gravel Co., O. N. Hirsch	a	Irvington	Irvington
Kaiser Paving	a	1522 Latham Square Bldg., Oakland	Radum
Kemper Bros.	b	5998 Strobridge Ave., Hayward	Hayward
Langdon Molding Sand, J. H. Langdon	c	R.F.D., Box 89, Niles	Decoto
Red Shale Quarry, W. S. McLean	d	419 Bayshore Blvd., San Francisco	Arroyo Mocho
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Eliot and Niles
Alfred W. Petersen	a	P.O. Box 943, Livermore	Livermore
San Leandro Rock Co., Lake Chabot Quarry	b	2485 Washington St., San Leandro	Lake Chabot
Butte County			
Bechtel-Kaiser Co., R. J. Kennedy, Mgr.	a, b	Oroville	Oroville
Lord & Bishop	a, b	Box 547, Oroville	Oroville
McLean's Quarry, W. S. McLean	d	419 Bayshore Blvd., San Francisco	McLean Spur
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Oroville

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

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STONE, MISCELLANEOUS—Continued

Under the heading of 'miscellaneous stone' there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

NOTE.—The California State Highway Commission, U. S. Bureau of Public Roads and U. S. Forest Service produce both crushed rock and sand and gravel in various places in the State used in construction and maintenance of highways, but not specified in this listing.

Operator	Product	Address	Location of pit or quarry
Calaveras County			
Pacific Minerals Co., Ltd.	d	337 10th St., Richmond	Angels
Pardee Dam, East Bay Mun. Utility Dist.	b	1924 Broadway, Oakland	Pardee Dam
Contra Costa County			
Contra Costa County	a	Martinez	
Antioch Asphalt Sand Co.	a	2008 Mission St., San Francisco	Antioch
Basalt Rock Co.	a	8th St., Napa	Antioch
Blake Bros. Co., Anson S. Blake	b	204 Balboa Bldg., San Francisco	Point Richmond
Hutchison Co., Stege Quarry	b	1450 Harrison St., Oakland	Stege
Oak Point Sand Co., Robert P. Easley, et al.	a	Antioch	Antioch
Ed Roberts	a, c	Pittsburg	Pittsburg
Silica Co. of Calif., Ltd.	c	Brentwood	Brentwood
Southern Pac. R. R. Co., Asst. Chief Engr.	a	Southern Pacific Bldg., San Francisco	Newlove
L. Stamm	a	Antioch	Antioch
Del Norte County			
Del Norte County	a	Crescent City	
El Dorado County			
El Dorado County	b	Placerville	Georgetown
Diamond Springs Lime Co.	b	Diamond Springs	Diamond Springs
Fresno County			
Grant-Service Rock Co., Cons.	a, b	T. W. Patterson Bldg., Fresno	El Prado
Pacific Coast Aggregates, Inc.	b	85 2d St., San Francisco	Piedra
Glenn County			
Southern Pacific Co.	a	65 Market St., San Francisco	Wyo
E. B. Bishop	a	Box 325, Orland	Wyo
Humboldt County			
Humboldt County	a	Eureka	
Benbow Hotel Co.	a	Benbow	Benbow
D. A. Boyd	a	R.F.D., Arcata	Arcata
Hemstreet & Bell	a, b	501 11th St., Marysville	
Mercer-Fraser Co.	a	2d and Commercial Sts., Eureka	Essex
Northwestern Pacific R. R. Co., Wm. N. Neff, Gen. Supt.	a	Sausalito	South Fork

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Imperial County			
Imperial Rock Corp.	b	P.O. Box 6, Niland	Niland
Inyo County			
Inyo Marble Co.	b, d	726-732 E. 29th St., Los Angeles	Lone Pine
Kern County			
Bakersfield Rock and Gravel Co.	a, b	Box 395, Station A, Bakersfield	----------
Kern Rock Co., Ltd.	a, b	P.O. Box 1697, Bakersfield	Kern River
Lake County			
Charles Kuppinger	a	Lakeport	Lakeport
Hemstreet & Bell	b	411 C St., Marysville	Upper Lake
Lassen County			
Red River Lumber Co.	b	Westwood	Westwood
Los Angeles County			
Arrow Rock Co.	a	P.O. Box 155, Monrovia	Monrovia
A., T. & S. F. R. R., I. L. Hibbard, Gen. Mgr.	a	609 Kerckhoff Bldg., Los Angeles	Forbes
Azusa Rock & Sand Co.	a, b	R.F.D., Azusa	Azusa
Richard R. Ball	a	Box 233, Walteria	Walteria
Bengal & Sons	a	1709 Monte Vista, Pasadena	Pasadena
Blue Diamond Corp., Ltd.	a	1650 S. Alameda St., Los Angeles	El Monte and Roscoe
Wm. J. Bonfield	g	2008 Laurel Canyon Rd., Los Angeles	Hollywood
Consolidated Rock Products Co.	a, b	2730 S. Alameda St., Los Angeles	Whittier and Fullerton
Ducey & Atwood Rock Co., R. K. Atwood, Pres.	a, b	Box 194, East Pasadena	East Pasadena
Eaton Canyon Rock and Sand Co.	a, b	2350 E. Colorado St., Pasadena	Pasadena
Graham Bros., Inc.	a, b, g	Long Beach	Catalina Island and Roscoe. El Monte and Rancho Qua's
Granite Material Co.	g	Box 363, N. Hollywood	N. Hollywood
Lindauer Corp.	a	Box 208, La Habra	La Habra
Los Angeles Harbor Dept., Bureau of Maintenance	b	City Hall, San Pedro	Santa Catalina
Los Angeles Dept. of Water and Power	b	207 S. Broadway, Los Angeles	----------
Los Angeles & Salt Lake R. R.	a	Pacific Electric Bldg., Los Angeles	----------
Los Angeles Decomposed Granite Co.	g	2171 W. Washington, Los Angeles	----------
Pacific Rock & Gravel Co.	a, b	458 S. Spring St., Los Angeles	Los Angeles
Reynolds Crushed Gravel	b, g	920 N. Humphreys Ave., Los Angeles	Los Angeles
Edward Sidebotham & Son, Inc., Sidebotham Sand Plants	a	McFarland and L Sts., Wilmington	Lomita
State Decomposed Granite Co.	g	2272 Laurel Canyon Blvd., Los Angeles	Hollywood
Madera County			
Madera County	a	Madera	----------
McGilvray Raymond Corp.	b	3 Potrero Ave., San Francisco	Raymond
Marin County			
Marin County	a	San Rafael	----------
Daniels Con. Co.	b	503 Market St., San Francisco	San Rafael
Hutchison Company	b	1450 Harrison St., Oakland	San Quentin

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

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STONE, MISCELLANEOUS—Continued

Under the heading of 'miscellaneous stone' there are four divisions—crushed rock, grinding mill pebbles, paving blocks, and sand and gravel. Crushed rock includes all crushed rock that is used in macadam, ballast and for concrete; also rock used for rubble and riprap.

NOTE.—The California State Highway Commission, U. S. Bureau of Public Roads and U. S. Forest Service produce both crushed rock and sand and gravel in various places in the State used in construction and maintenance of highways, but not specified in this listing.

Operator	Product	Address	Location of pit or quarry
Mariposa County			
Yosemite National Park	a, b	Yosemite	Yosemite National Park
Mendocino County			
Ukiah Gravel & Cement Co., John Freitas	a	Ukiah	Ukiah
Merced County			
Merced County	a	Merced	Los Banos
Fred Ragsdale	a, b	Merced	Merced
J. W. Huffman, Bair Creek Gravel Pit	a	Merced	Merced
Modoc County			
Great Northern Ry., A. E. Knight, Supt.	c	Klamath Falls, Ore.	
Hemstreet & Bell	b	411 C St., Marysville	Adin
Southern Pacific R.R. Co., Asst. Chief Engr.	b	Southern Pacific Bldg., San Francisco	Knowles (Goose Lake)
Mono County			
L. A. Dept. of Water & Power	a	207 S. Broadway, Los Angeles	Mono Craters
Monterey County			
County Surveyor, Monterey County	a	Salinas	
Del Monte Properties Co., C. S. Olmster	a, c	Del Monte	Del Monte
M. J. Murphy	b	Monte Verde and 9th Sts., Carmel	Carmel
Pacific Coast Aggregates, Inc.	a	85 2d St., San Francisco	Lapis and Prattco
Pacific Coast Steel Corp., F. E. Watts	b	20th and Illinois, San Francisco	Natividad
S. Ruthven, Seaside Sand Pit	a	Seaside	Seaside
Southern Pacific Co.	a	65 Market St., San Francisco	Lapis
Napa County			
Napa County	b	Napa	Napa
Basalt Rock Co.	b	8th St., Napa	Napa
Errington Quarry, Ray Errington	a	Napa	Napa
Thorsen Gravel Pit, Harry Thorsen	a	St. Helena	St. Helena
Nevada County			
Golden Center Mine, L. S. Wincapaw, Mgr.	b	Grass Valley	Grass Valley
Orange County			
Orange County	g	Santa Ana	
Consolidated Rock Products Co.	a, b	56 S. Los Angeles St., Los Angeles	Whittier and Fullerton
National Cement Pipe Co.	a	Drawer K, Santa Ana	Santa Ana
B. A. Stoffel	a	Anaheim	Anaheim

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Placer County			
Victor Wickman	b	Rocklin	Rocklin
Plumas County			
Western Pac. R. R. Co., E. W. Mason, Gen. Supt.	b	Mills Bldg., San Francisco	
Riverside County			
Riverside County	a	Courthouse, Riverside	
A. T. & S. F. R. R. Co., I. L. Hibbard, Gen. Mgr.	b	609 Kerchhoff Bldg., Los Angeles	Corona
Graham Bros.	a	Long Beach	Thermal, Whitewater
Kuster & Waterburg	a	Corona	Corona
Riverside, City of	b	Riverside	Riverside
The Service Gravel Co., F. A. Braman	a	4324 10th St., Riverside	Riverside
P. J. Weisel, Industrial Sands	a, c	La Habra	Corona
Sacramento County			
Sacramento County	a	Sacramento	
Cannon & Co.	c	North Sacramento	Ben Ali
Del Paso Rock and Gravel Co.	a, b	H St. Rd., Sacramento	Del Paso
Folsom State Prison	b	Represa	Represa
Mucke Sand & Gravel Co.	a, b	Mayhews	Mayhews
Pacific Coast Aggregates. Inc.	a, b	85 2d St., San Francisco	Fair Oaks, Mayhews and American River
Perkins	a, b	Perkins	Perkins
Robert Powell & Co.	a	P.O. Box 815, Sacramento	American River
San Benito County			
San Benito County	a	Hollister	
Granite Rock Co.	b	Drawer M., Watsonville	Logan
Southern Pacific Co.	a, b	65 Market St., San Francisco	Logan
San Bernardino County			
County Highway Commissioner San Bernardino County	a, b	San Bernardino	
A. T. & S. F. R. R.	a	609 Kerckhoff Bldg., Los Angeles	Gale
Consolidated Rock Products Co., Ltd.	a, b	656 S. Los Angeles St., Los Angeles	
Declezville Stone Co., Ltd., Merritt Chapman & Scott Corp.	b	Box 698, San Pedro	S. Fontana
Hanawalt Bros.	a, b	2151 D St., La Verne	La Verne
Fourth Street Rock Crusher, A. O. Johnson	a	San Bernardino	San Bernardino
Los Angeles Dept. of Water and Power	a	207 S. Broadway, Los Angeles	
Pacific Minerals, Inc.	d	337 10th St., Richmond	Barstow
Redlands Gravel Co.	a, b	Redlands	Redlands
Southern Pacific Co.	b	65 Market St., San Francisco	South Fontana
Triangle Rock & Gravel Co.	a, b	San Bernardino	San Bernardino
San Diego County			
Calavera Rock Corp.	b	Oceanside	Oceanside
Canyon Rock Co.	a, b	3911 5th Ave., San Diego	San Diego
Crystal Silica Sand Co.	a	Oceanside	Oceanside
H. G. Fenton Material Co.	a	13th and Imperial Ave., San Diego	San Diego
R. M. Hubbard	c	406 W. Nutmeg St., San Diego	San Diego

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

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STONE, MISCELLANEOUS—Continued

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Operator	Product	Address	Location of pit or quarry
San Diego County—Continued			
John T. Momand	f	Box 381, Carlsbad	Oceanside
Nelson & Sloan	a	P.O. Box 832, Chula Vista	Chula Vista
Oceanside Rock & Sand Co.	a	Carlsbad	Oceanside
A. Morris Sides	a, d	1557 Courtney Ave., Los Angeles	
San Francisco County			
Mission Quarry Co.	b	210 Balboa Bldg., San Francisco	San Francisco
San Joaquin County			
Highway Maintenance Dept., San Joaquin County	a	Court House, Stockton	
J. S. Cowan	a	R.F.D. 2, Box 29, Escalon	Ryson
L. Lorentzen	a	741 Third St., Petaluma	
Frank Marks	a, b	Newman	Tracy
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Riverbank
Santa Fe Sand and Gravel Co., W. A. Arlington	a	P.O. Box 271, Escalon	Escalon
Elmer J. Warner	a	1128 E. Roosevelt St., Stockton	Stockton
San Luis Obispo County			
San Luis Obispo County	a	San Luis Obispo	
Guiton Molding Sand, Harold E. Guiton	c	Oceano	Oceano
Gularte Gravel Pit, M. Gularte	a	Santa Margarita	Santa Margarita
Walter B. Roselip	a	615 Grand Ave., San Luis Obispo	Santa Margarita
San Mateo County			
San Mateo County	b	Redwood City	
M. F. Cunha, Vasques Quarry	b	Main St., Half Moon Bay	Half Moon Bay
Golden West Quarry	b	S. San Francisco	
Holy Cross Cemetery	b	Colma	Colma
Industrial Mineral Products, W. B. Vestal	c	772 Bryant St., San Francisco	
Market St. Ry. Co., Daly's Quarry	b	58 Sutter St., San Francisco	Daly City
Skyline Quarry, Parker Pugh	b	Box 202, Redwood City	Skyline Blvd.
Santa Barbara County			
H. G. Iliff	a	Santa Maria	Santa Maria

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Santa Clara County			
County Quarry, Santa Clara County	b	Hall of Records	Saratoga
Arrowhead Gravel Co.	a	20 Maple Ave., Watsonville	Watsonville
Carroll Gravel Pit, R. D. Carroll	a	R.F.D. 4, Box 310A, San Jose	San Jose
A. G. Jahn	a	R.F.D. 4, Box 362, San Jose	San Jose
Jas. A. Lemieux	a	Box 341, Senter Rd., San Jose	San Jose
Los Gatos Sand and Gravel Co.	a	Los Gatos	Los Gatos
J. W. Lovejoy	b	R.F.D. 1, Box 88, Mountain View	Mountain View
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Coyote and Campbell
Rhodes & Robinson Stanford Quarry	b	Box 325, Palo Alto	Palo Alto
Southern Pacific Co.	a	65 Market St., San Francisco	Coyote
Sunnyvale Gravel Co.	a	Sunnyvale	Sunnyvale, Alamitos
Taafe Construction Co.	b	Los Altos	Los Altos
Santa Cruz County			
Santa Cruz County	b	Santa Cruz	Santa Cruz
Atlas Olympia Co.	a	209 Underwood Bldg., San Francisco	Olympia
Central Supply Co.	a	P.O. Box 524, Santa Cruz	Santa Cruz
Mead Felton Sand & Gravel Co., H. G. Mead	a	Felton	Felton
Pacific Limestone Products Co.	b	Santa Cruz	Santa Cruz
Santa Cruz Portland Cement Co.	b	Crocker Bldg., San Francisco	Davenport
Shasta County			
Shasta County	a, b	Redding	
Destelhorst Gravel Plant, Chas. Diestelhorst	a, b	1040 Liberty St., Redding	Redding
Lassen Volcanic Nat'l Park	b	Mineral via Red Bluff	Lassen Nat'l Park
Pacific Gas & Elec. Co., W. G. Vincent, V. Pres. & Ex. Eng.	b	245 Market St., San Francisco	Pit River
Siskiyou County			
King Solomon Mines Co.	f	Crocker Bldg., San Francisco	Black Bear
W. D. Miller Const. Co.	a	Klamath Falls, Ore.	Graham Siding
Southern Pacific R. R. Co., Asst. Chief Engineer	c	Southern Pacific Bldg., San Francisco	Kegg
A. Young	a	Yreka	Yreka
Sonoma County			
County Surveyor & Engineer	a	Santa Rosa	
Basalt Rock Co.	a	8th St. Napa	Healdsburg
S. Cabrol	b	Glen Ellen	Glen Ellen
Hein Bros. Basalt Rock Co., Mark Hein, Pres.	b	Petaluma	Petaluma
Independent Gravel Co.	a	Forestville	Forestville
Northwest Gravel Co.	a	844-A Mills Bldg., San Francisco	Chianti
Petaluma and Santa Rosa, E. R. R., E. H. Maggard, Mgr.	b	Petaluma	Stony Point
Santa Rosa Basalt Co., Jas. A. Anderson	a	5687 Miles Ave., Oakland	Santa Rosa
Stony Point Quarry, W. A. Wilson	b	Petaluma, Star Rt.	Stony Point

a. Sand and gravel. b. Crushed rock (macadam, ballast, rubble, riprap, etc.). c. Molding sand. d. Granules for roofing, terrazzo. e. Slag and volcanic cinder. f. Tube-mill pebbles. g. Decomposed granite.

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STONE, MISCELLANEOUS—Continued

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Operator	Product	Address	Location of pit or quarry
Stanislaus County			
Atlas Olympia Co.	a	209 Underwood Bldg., San Francisco	Orange Blossom
Hammatt Gravel Plant, V. M. Hammatt	a	Hughson	Hughson
W. Haslan	a	Oakdale	Oakdale
Frank B. Marks	a	Newman	Crows Landing
Oakdale Irrigation Dist., M. E. Robinson, Auditor	a	Oakdale	Oakdale
Putman Sand & Gravel Co.	a	Modesto	Modesto
Rinehart Sand Pit, Rinehart Bros.	a	Modesto	Modesto
J. P. Scanlon, Scanlon Gravel Pit	a	Patterson	Crows Landing
Southern Pacific Co.	a	65 Market St., San Francisco	Newman
Stewart Gravel Pit, John Stewart	a	Crows Landing	Crows Landing
Chas. Warner	a	Modesto	Modesto
Tehama County			
Hemstreet & Bell	a	411 C St., Marysville	Red Bluff
Tehama County	a, b	Red Bluff	
Trinity County			
Trinity County	a	Weaverville	
S. Eastwood	a	Douglas City	Douglas City
Tulare County			
Tulare County	g	Visalia	
J. J. Dugan & Sons	a	R.F.D. 2, Box 120, Porterville	Porterville
O. C. Jeffers	a	Star Rt. 2, Porterville	Porterville
Nelson Concrete Pipe Co., John Nelson	a	Box 32, Strathmore	Strathmore
Porterville Cement Pipe Co.	a	P.O. Box 396, Porterville	Porterville
Pacific Coast Aggregates, Inc.	a, b	85 2d St., San Francisco	Lemon Cove and Lindsay
Supt. Sequoia National Park	a, b	Three Rivers	Sequoia Natl. Park
Tulare Rock Co., O. Holliday	a, b	Lindsay	Lindsay
Ventura County			
Ventura County	b	Ventura	
El Rio Rock Co.	a, b	P.O. Box 381, Ventura	El Rio
Montalvo Rock Co.	a	Montalvo	Montalvo
Piru Rock Co.	a, b	Piru	Piru
Santa Paula Rock Co.	a	Willard Bridge, Santa Paula	Santa Paula
Saticoy Rock Products Co.	a, b	Saticoy	Saticoy-Ventura
Ventura Velvet Molding Sand, Chas. A. Cole	c	1355 Church St., Ventura	Ventura
Southern Pacific Co.	a, b	65 Market St., San Francisco	Rockbank and Chrisman

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Yolo County			
Yolo County, County Engineer	a	Yolo	Yolo
C. and H. Gravel Co., J. J. Hartley	a	Davis	Davis
Leroy Kerr	a	Yolo	
Frank Newman	a	Woodland	Woodland
Yolo Gravel Co.	a	P.O. Box 7, Yolo	Yolo
Yuba County			
Yuba County, County Clerk	a	Marysville	
Hemstreet & Bell	a, b	501 11th St., Marysville	
N. F. Makle	a	715 D St., Marysville	Marysville
Pacific Coast Aggregates, Inc.	a	85 2d St., San Francisco	Marysville
Yuba River Sand Co.	a	Marysville	Marysville

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SULPHUR

Operator	Address	Location of mine
Inyo County		
Delaware Sulphur Mines, Grover Kihorny	2131 Bonita Dr., Glendale	Zurich

TUNGSTEN

Operator	Address	Location of mine
Kern County		
El Diablo Mining Co., H. O. Johanson	Kernville	Kernville
San Bernardino County		
Atolia Mining Co.	Crocker Bldg., San Francisco	Randsburg
Atolia-Rand Placers, Inc.	215 W. 5th St., Los Angeles	Atolia

ZINC

Mine	Operator	Address	Location of mine
Inyo County			
Estelle & Cerro Gordo	Estelle Mines Corp.	972 S. 4th St., Los Angeles	Keeler
Estelle & Cerro Gordo	Silver Lead Syndicate	502 Scott Bldg., Salt Lake City, Utah	Keeler
Leary	F. R. Long, Inc.	Richfield Bldg., Los Angeles	Keeler
Orange County			
Blue Light	Hughes Mitchell Processes Co.	Box 147, Torrance	Silverado

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APPENDIX

MINING BUREAU ACT

Chap. 670 [Stats. 1913]; amended, Chap. 280 [Stats. 1929]; amended, Chap. 748 [Stats. 1933].

An act establishing a state mining bureau, creating the office of state mineralogist, fixing his salary and prescribing his powers and duties; providing for the employment of officers and employees of said bureau, making it the duty of persons in charge of mines, mining operations and quarries to make certain reports, providing for the investigation of mining operations, dealings and transactions and the prosecution for defrauding, swindling and cheating therein, creating a state mining bureau fund for the purpose of carrying out the provisions of this act and repealing an act entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all acts amendatory thereof and supplemental thereto or in conflict herewith.

[Approved June 16, 1913. In effect August 10, 1913.]

[Amendment (Sec. 16) approved May 14, 1929. In effect August 14, 1929.]

[Amendment (Sec. 10) approved June 5, 1933. In effect August 21, 1933.]

The people of the State of California do enact as follows:

SECTION 1. There is hereby created and established a state mining bureau. The chief officer of such bureau shall be the state mineralogist, which office is hereby created.

SEC. 2. It shall be the duty of the governor of the State of California and he is hereby empowered to appoint a citizen and resident of this state, having a practical and scientific knowledge of mining, to the office of state mineralogist. Said state mineralogist shall hold his office at the pleasure of the governor. He shall be a civil executive officer. He shall take and subscribe the same oath of office as other state officers. He shall receive for his services a salary of three hundred dollars ($300) per month, to be paid at the same time and in the same manner as the salaries of other state officers. He shall also receive his necessary traveling expenses when traveling on the business of his office. He shall give bond for the faithful performance of his duties in the sum of ten thousand dollars ($10,000), said bond to be approved by the governor of the State of California.

SEC. 3. Said state mineralogist shall employ competent geologists, field assistants, qualified specialists and office employees when necessary in the execution of his plans and operations of the bureau, and fix their compensation. The said employees shall be allowed their necessary traveling expenses when traveling on the business of said department and shall hold office at the pleasure of said state mineralogist.

SEC. 4. It shall be the duty of said state mineralogist to make, facilitate, and encourage, special studies of the mineral resources and mineral industries of the state. It shall be his duty: to collect statistics concerning the occurrence and production of the economically important minerals and the methods pursued in making their valuable constituents available for commercial use; to make a collection of typical geological and mineralogical specimens, especially those of economic and commercial importance, such collection constituting the museum of the state mining bureau; to provide a library of books, reports, drawings, bearing upon the mineral industries, and sciences of mineralogy and geology, and arts of mining and metallurgy, such library constituting the library of the state mining bureau; to make a collection of models, drawings and descriptions of the mechanical appliances used in mining and metallurgical processes; to preserve and so maintain such collections

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and library as to make them available for reference and examination, and open to public inspection at reasonable hours; to maintain, in effect, a bureau of information concerning the mineral industries of this state, to consist of such collections and library, and to arrange, classify, catalogue, and index the data therein contained, in a manner to make the information available to those desiring it; to issue from time to time such bulletins as he may deem advisable concerning the statistics and technology of the mineral industries of this state.

SEC. 5. It is hereby made the duty of the owner, lessor, lessee, agent, manager or other person in charge of each and every mine, of whatever kind or character, within the state, to forward to the state mineralogist, upon his request, at his office not later than the thirty-first day of March, in each year, a detailed report upon forms which will be furnished showing the character of the mine, the number of men then employed, the method of working such mine and the general condition thereof, the total mineral production for the past year, and such owner, lessor, lessee, agent, manager or other person in charge of any mine within the state must furnish whatever information relative to such mine as the state mineralogist may from time to time require for the proper discharge of his official duties. Any owner, lessor, lessee, agent, manager or other person in charge of each and every mine of whatever kind or character within the state, who fails to comply with the above provisions shall be deemed guilty of a misdemeanor.*

SEC. 6. The state mineralogist now performing the duties of the office of state mineralogist shall perform the duties of the office of state mineralogist as in this act provided until the appointment and qualification of his successor as in this act provided.

SEC. 7. The said state mineralogist shall take possession, charge and control of the offices now occupied and used by the board of trustees and state mineralogist and the museum, library and laboratory of the mining bureau located in San Francisco as provided for by a certain act of the legislature approved March 23, 1893, and hereafter referred to in section fourteen hereof, and shall maintain such offices, museum, library and laboratory for the purposes provided in this act.

SEC. 8. Said state mineralogist or qualified assistant shall have full power and authority at any time to enter or examine any and all mines, quarries, wells, mills, reduction works, refining works and other mineral properties or working plants in this state in order to gather data to comply with the provisions of this act.

SEC. 9. The state mineralogist shall make a biennial report to the governor on or before the fifteenth day of September next preceding the regular session of the legislature.

SEC. 10. All moneys received by the State Mining Bureau (or State Division of Mines) or any officer thereof, from sales of publications issued by said bureau, shall be deposited at least once each month in the State treasury to the credit of a fund which is hereby created and designated "Division of mines revolving printing fund." Said fund shall be used and is hereby appropriated for the use of said bureau in addition to such other funds as may be from time to time appropriated by the Legislature, for the printing and publishing of reports, bulletins, and maps issued by the said bureau. The State Controller is authorized to require financial reports from the State Mining Bureau or any officer thereof.

SEC. 11. The said state mineralogist is hereby authorized and empowered to receive on behalf of this state, for the use and benefit of the state mining bureau, gifts, bequests, devises and legacies of real or other property and to use the same in accordance with the wishes of the donors, and if no instructions are given by said donors, to manage, use, and dispose of the gifts and bequests and legacies for the best interests of said state mining bureau and in such manner as he may deeem proper.

SEC. 12. The state mineralogist may, whenever he deems it advisable, prepare a special collection of ores and minerals of California to be sent to or used at any world's fair or exposition in order to display the mineral wealth of the state.

SEC. 13. The state mineralogist is hereby empowered to fix a price upon and to dispose of to the public, at such price, any and all publications of the state mining bureau, including reports, bulletins, maps, registers or other publications, such price shall approximate the cost of publication and distribution. Any and all sums derived from such disposition, or from gifts or bequests made, as hereinbefore pro-

* Sec. 19 of the Penal Code of California provides: "Except in cases where a different punishment is prescribed by this code, every offense declared to be a misdemeanor is punishable by imprisonment in a county jail not exceeding six months, or by a fine not exceeding five hundred dollars, or by both."

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vided, must be accounted for by said state mineralogist and turned over to the state treasurer to be credited to the mining bureau fund as provided for in section ten. He is also empowered to furnish without cost to public libraries the publications of the bureau and to exchange publications with other geological surveys and scientific societies, etc.

SEC. 14. The state mineralogist provided for by this act shall be the successor in interest of the board of trustees of the state mining bureau, and the state mineralogist, under and by virtue of that certain act, entitled "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, who shall have the direction, management, and control of said state mining bureau, and to provide for the appointment, duties, and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, and all books, papers, documents, personal property, records, and property of every kind and description obtained or possessed, or held or controlled by the said board of trustees of the said state mining bureau, and the state mineralogist, and the clerks and employees thereof, under the provisions of said act of March 23, 1893, or any act supplemental thereto or amendatory thereof, shall immediately be turned over and delivered to the said state mineralogist herein provided for, who shall have charge and control thereof.

SEC. 15. That certain act entitled, "An act to provide for the establishment, maintenance, and support of a bureau, to be known as the state mining bureau, and for the appointment and duties of a board of trustees, to be known as the board of trustees of the state mining bureau, and to provide for the appointment, duties and compensation of a state mineralogist, who shall perform the duties of his office under the control, direction, and supervision of the board of trustees of the state mining bureau," approved March 23, 1893, together with all acts amendatory thereof and supplemental thereto and all acts in conflict herewith are hereby repealed.

SEC. 16. For the purpose of this act and as used herein the term "mine" is hereby defined to embrace and include all mineral bearing properties of whatever kind or character whether underground, quarry, pit, well, spring or other source from which any mineral substance is or may be obtained, and the term "mineral" for the purposes of this act and whenever so used shall embrace and include any and all mineral products both metallic and nonmetallic, solid, liquid or gaseous, and mineral waters of whatever kind or character.

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DEPARTMENT OF NATURAL RESOURCES ACT

Chap. 128 [Stats. 1927]; amended, Chap. 307 [Stats. 1929.]

An act to add a new article to chapter three of title one of part three of the Political Code to be numbered article two j, embracing sections three hundred seventy-three to three hundred seventy-three i, relating to a department of natural resources.

[Approved by the Governor April 13, 1927.]

[Amendment approved May 18, 1929.]

The people of the State of California do enact as follows:

SECTION 1. The Political Code is hereby amended by adding a new article to chapter III of title I of part III thereof, to be numbered article II*j*, embracing sections 373 to 373*i* and to read as follows:

ARTICLE II*j*.

DEPARTMENT OF NATURAL RESOURCES

373. A department of the government of the State of California to be known as the department of natural resources is hereby created. The department shall be conducted under the control of an executive officer to be known as the director of natural resources, which office is hereby created. The director shall be appointed by and hold office at the pleasure of the governor and shall receive a salary of six thousand dollars per annum.

Except as in this article otherwise provided, the provisions of article II of this chapter, title, and part of the Political Code as adopted at the forty-fourth session of the Legislature and as the same may be amended from time to time, shall govern and apply to the conduct of the department of natural resources in every respect the same as if such provisions were herein set forth at length and wherever in said article II the term "head of the department" or similar designation occurs, the same shall for the purposes of this article mean the director of natural resources.

373*a*. For purposes of administration the department shall be forthwith organized by the director thereof, subject to the approval of the governor, in such manner as he shall deem necessary to properly segregate and conduct the work of the department, and the director shall have power to appoint, in accordance with the civil service and other provisions of law, such deputies, officers and other expert and clerical assistants as may be necessary. The work of the department is hereby divided into at least four divisions to be known as the division of forestry, the division of parks, the division of fish and game, and the division of mines.

373*b*. The division of mines shall be administered through a chief who shall be appointed by the director of natural resources upon the nomination of the state mining board, the chief to be a technically trained mining engineer and to be known as the state mineralogist; such chief shall receive a salary of six thousand dollars per annum. General policies for the guidance of the division of mines shall be determined by a board to be known as the state mining board, which shall consist of five members appointed by and to hold office at the pleasure of the governor.

373*c*. The division of forestry shall be administered through a chief of division who shall be known as the state forester, who shall be a technically trained forester, appointed by the director of natural resources upon nomination by the state board of forestry hereinafter provided. General policies for the guidance of the division of forestry shall be determined by a state board of forestry which shall consist of seven members appointed by and holding office at the pleasure of the governor. Of the seven members one shall be familiar with the pine timber industry, one with the redwood industry, one with the live stock industry, one with general agriculture and one with the problems of water conservation.

373*d*. The division of parks shall be administered through a chief of division who shall be appointed by the director of natural resources upon nomination by the

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state park commission hereinafter provided. General policies for the administration of the state park system shall be determined by the state park commission which is hereby created to consist of five members appointed by the governor and holding office at his pleasure.

373*e*. The division of fish and game shall be administered through a fish and game commission consisting of three members appointed by and holding office at the pleasure of the governor.

373*f*. The chiefs of the divisions of forestry and parks respectively shall receive such salaries as may be determined by the director with the approval of the governor. The director of natural resources and the chief of each division before entering upon his duties shall execute to the State of California an official bond in the penal sum of twenty-five thousand dollars conditioned upon the faithful performance of his duties. The members of the board of forestry, the state parks commission and fish and game commission shall serve without compensation, but shall be entitled to their actual expenses incurred in the performance of their duties.

373*g*. The department of natural resources shall succeed to and is hereby invested with all the duties, powers, purposes, responsibilities and jurisdiction of the state mining bureau, state mineralogist, department of petroleum and gas, state oil and gas supervisor, state forester, state board of forestry, California redwood park commission, San Pasqual battlefield commission, Mount Diablo park commission, state fish and game commission, state fish and game commissioners, and, except as herein otherwise provided, of the several officers, deputies and employees of such bodies and offices, and whenever by the provisions of any statute or law now in force or that may hereafter be enacted a duty or jurisdiction is imposed or authority conferred upon any of said officers, offices, bodies, deputies or employees by any statute the enforcement of which is transferred to the department, such duty, jurisdiction and authority are hereby imposed upon and transferred to the department of natural resources and the appropriate officers thereof with the same force and effect as though the title of said department of natural resources had been specifically set forth and named therein in lieu of the name of any such body, office, officer, deputy or employee. Said bodies and offices, the duties, powers, purposes, responsibilities and jurisdiction of which are so transferred and vested in the department of natural resources, and the positions of all officers, deputies and employees thereunder, are and each of them is hereby abolished and shall have no further legal existence, but the statutes and laws under which they existed and all laws prescribing their duties, powers, purposes, responsibilities and jurisdiction, together with all lawful rules and regulations established thereunder are hereby expressly continued in force.

The department of natural resources shall be in possession and control of all records, books, papers, offices, equipment, supplies, moneys, funds, appropriations, land and other property real or personal now or hereafter held for the benefit or use of said bodies, offices and officers.

The boards of district oil and gas commissioners, the offices of district oil and gas commissioners and the board of review, correction and equalization created by the act approved June 10, 1915, establishing the department of petroleum and gas, are hereby respectively continued in force with the powers, duties, responsibilities and jurisdiction in them vested by the provisions of said act approved June 10, 1915, as amended; *provided*, that said board of review shall consist of the director of natural resources, the director of finance and the chairman of the state board of equalization.

373*h*. The management and control of the property acquired by the State of California under or pursuant to the provisions of the act entitled "An act to accept the gift to the state of San Pasqual battlefield in San Diego county, to provide for collecting and systematizing the history of said battle, for determining the exact location thereof, and to report a suitable method of marking said battlefield and commemorating the heroism of those Americans who fought and died there," approved May 11, 1919, is hereby transferred to and vested in the department of natural resources.

373*i*. From and after the date upon which this act takes effect, the department of natural resources shall be and is hereby authorized and empowered to expend the moneys in any appropriation or in special fund in the state treasury now remaining or made available by law for the administration of the provisions of all the statutes the administration of which is committed to the department, or for the use, support, or maintenance of any board, bureau, commission, department,

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office or officer whose duties, powers, and functions are, by the provisions of this article, transferred to and conferred upon the department of natural resources. Such expenditures by the department shall be made in accordance with law in carrying out the purposes for which such appropriations were made or such special funds created.

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PUBLICATIONS OF THE DIVISION OF MINES

During the past fifty-four years, in carrying out the provisions of the organic act creating the former California State Mining Bureau, there have been published many reports, bulletins and maps which go to make up a library of detailed information on the mineral industry of the State, a large part of which could not be duplicated from any other source.

One feature that has added to the popularity of the publications is that many of them have been distributed without cost to the public, and even the more elaborate ones have been sold at a price which barely covers the cost of printing.

Owing to the fact that funds for the advancing of the work of this department have usually been limited, the reports and bulletins mentioned are printed in limited editions many of which are now entirly exhausted.

Copies of such publications are available, however, in the offices of the Division of Mines, in the Ferry Building, San Francisco; State Building, Los Angeles; State Office Building, Sacramento; Redding; and Division of Oil and Gas at Santa Barbara, Santa Paula, Coalinga, Taft, Bakersfield. They may also be found in many public, private and technical libraries in California and other states and foreign countries.

A catalog of all publications from 1880 to 1917, giving a synopsis of their contents, is issued as Bulletin No. 77.

Publications in stock may be obtained by addressing any of the above offices and enclosing the requisite amount in the case of publications that have a list price. Only coin, stamps or money orders should be sent, and it will be appreciated if remittance is made in this manner rather than by personal check.

Money orders should be made payable to the Division of Mines.

NOTE.—The Division of Mines frequently receives requests for some of the early Reports and Bulletins now out of print, and it will be appreciated if parties having such publications and wishing to dispose of them will advise this office.

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REPORTS

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**First Annual Report of the State Mineralogist, 1880, 43 pp. Henry G. Hanks	----
**Second Annual Report of the State Mineralogist, 1882, 514 pp., 4 illustrations, 1 map. Henry G. Hanks	----
**Third Annual Report of the State Mineralogist, 1883, 111 pp., 21 illustrations. Henry G. Hanks	----
**Fourth Annual Report of the State Mineralogist, 1884, 410 pp., 7 illustrations. Henry G. Hanks	----
**Fifth Annual Report of the State Mineralogist, 1885, 234 pp., 15 illustrations, 1 geological map. Henry G. Hanks	----
Sixth Annual Report of the State Mineralogist, Part I, 1886, 145 pp., 3 illustrations, 1 map. Henry G. Hanks	$0.70
Part II, 1887, 222 pp., 36 illustrations. William Irelan, Jr.	.70
**Seventh Annual Report of the State Mineralogist, 1887, 315 pp. William Irelan, Jr.	----
**Eighth Annual Report of the State Mineralogist, 1888, 948 pp., 122 illustrations. William Irelan, Jr.	----
Ninth Annual Report of the State Mineralogist, 1889, 352 pp., 57 illustrations, 2 maps. William Irelan, Jr.	1.15
**Tenth Annual Report of the State Mineralogist, 1890, 983 pp., 179 illustrations, 10 maps. William Irelan, Jr.	----
Eleventh Report (First Biennial) of the State Mineralogist, for the two years ending September 15, 1892, 612 pp., 73 illustrations, 4 maps. William Irelan, Jr.	1.25
**Twelfth Report (Second Biennial) of the State Mineralogist, for the two years ending September 15, 1894, 541 pp., 101 illustrations, 5 maps. J. J. Crawford	----
**Thirteenth Report (Third Biennial) of the State Mineralogist, for the two years ending September 15, 1896, 726 pp., 93 illustrations, 1 map. J. J. Crawford	----
Chapters of the State Mineralogist's Report, Biennial Period, 1913-1914, Fletcher Hamilton:	
Mines and Mineral Resources, Amador, Calaveras and Tuolumne Counties, 172 pp., paper	.60
Mines and Mineral Resources, Colusa, Glenn, Lake, Marin, Napa, Solano, Sonoma and Yolo Counties, 208 pp., paper	.60
Mines and Mineral Resources, Del Norte, Humboldt and Mendocino Counties, 59 pp., paper	.35
**Mines and Mineral Resources, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin and Stanislaus Counties, 220 pp., paper	----
Mines and Mineral Resources of Imperial and San Diego Counties, 113 pp., paper	.50
Mines and Mineral Resources, Shasta, Siskiyou and Trinity Counties, 180 pp., paper	.60
Fourteenth Report of the State Mineralogist, for the Biennial Period 1913-1914, Fletcher Hamilton, 1915: A General Report on the Mines and Mineral Resources of Amador, Calaveras, Tuolumne, Colusa, Glenn, Lake, Marin, Napa, Solano, Sonoma, Yolo, Del Norte, Humboldt, Mendocino, Fresno, Kern, Kings, Madera, Mariposa, Merced, San Joaquin, Stanislaus, San Diego, Imperial, Shasta, Siskiyou and Trinity Counties, 974 pp., 275 illustrations, cloth	3.00
Chapters of the State Mineralogist's Report, Biennial Period, 1915-1916. Fletcher Hamilton:	
Mines and Mineral Resources, Alpine, Inyo and Mono Counties, 176 pp., paper	.75
Mines and Mineral Resources, Butte, Lassen, Modoc, Sutter and Tehama Counties, 91 pp., paper	.55
Mines and Mineral Resources, El Dorado, Placer, Sacramento and Yuba Counties, 198 pp., paper	.75
Mines and Mineral Resources, Monterey, San Benito, San Luis Obispo, Santa Barbara and Ventura Counties, 183 pp., paper	.75

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Mines and Mineral Resources, Los Angeles, Orange and Riverside Counties, 136 pp., paper	$0.60
Mines and Mineral Resources, San Bernardino and Tulare Counties, 186 pp., paper	.75
**Fifteenth Report of the State Mineralogist, for the Biennial Period 1915-1916, Fletcher Hamilton, 1917: A General Report on the Mines and Mineral Resources of Alpine, Inyo, Mono, Butte, Lassen, Modoc, Sutter, Tehama, Placer, Sacramento, Yuba, Los Angeles, Orange, Riverside, San Benito, San Luis Obispo, Santa Barbara, Ventura, San Bernardino and Tulare Counties, 990 pp., 413 illustrations, cloth	----
Chapters of the State Mineralogist's Report, Biennial Period, 1917-1918, Fletcher Hamilton:	
Mines and Mineral Resources of Nevada County, 270 pp., paper	.90
Mines and Mineral Resources of Plumas County, 188 pp., paper	.60
Mines and Mineral Resources of Sierra County, 144 pp., paper	.60
Seventeenth Report of the State Mineralogist, 1920, 'Mining in California during 1920,' Fletcher Hamilton; 562 pp., 71 illustrations, cloth	2.00
Eighteenth Report of the State Mineralogist, 1922, 'Mining in California,' Fletcher Hamilton. Chapters published monthly beginning with January, 1922:	
**January, **February, March, April, **May, June, July, August, September, October, November, December, 1922	.30
Chapters of Nineteenth Report of the State Mineralogist, 'Mining in California,' Fletcher Hamilton and Lloyd L. Root. January, February, March, September, 1923	.30
Chapters of Twentieth Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly. January, April, July, October, 1924, per copy	.30
Chapters of Twenty-first Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:	
January, 1925, Mines and Mineral Resources of Sacramento, Monterey and Orange Counties	.30
April, 1925, Mines and Mineral Resources of Calaveras, Merced, San Joaquin, Stanislaus and Ventura Counties	.30
July, 1925, Mines and Mineral Resources of Del Norte, Humboldt and San Diego Counties	.30
October, 1925, Mines and Mineral Resources of Siskiyou, San Luis Obispo and Santa Barbara Counties	.30
Chapters of Twenty-second Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:	
January, 1926, Mines and Mineral Resources of Trinity and Santa Cruz Counties	.30
April, 1926, Mines and Mineral Resources of Shasta, San Benito and Imperial Counties	.35
July, 1926, Mines and Mineral Resources of Marin and Sonoma Counties	.30
**October, 1926, Mines and Mineral Resources of El Dorado and Inyo Counties, also report on Minaret District, Madera County	----
Chapters of Twenty-third Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:	
January, 1927, Mines and Mineral Resources of Contra Costa County; Santa Catalina Island	.35
April, 1927, Mines and Mineral Resources of Amador and Solano Counties	.30
**July, 1927, Mines and Mineral Resources of Placer and Los Angeles Counties	----
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Chapters of Twenty-fourth Report of the State Mineralogist, 'Mining in California,' Lloyd L. Root. Published quarterly:	
January, 1928, Mines and Mineral Resources of Tuolumne County	.30
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July, 1928, Mines and Mineral Resources of Butte and Tehama Counties	.30

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October, 1928, Mines and Mineral Resources of Plumas and Madera Counties	$0.30
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April, 1929, Mines and Mineral Resources of Sierra, Napa, San Francisco and San Mateo Counties	.35
July, 1929, Mines and Mineral Resources of Colusa, Fresno and Lake Counties	.35
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Chapters of Twenty-sixth Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:	
January, 1930, Mines and Mineral Resources of Santa Clara County; also Barite in California	.30
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October, 1930, Mines and Mineral Resources of Butte, Kings and Tulare Counties; also Geology of Southwestern Mono County (Preliminary)	.35
Chapters of Twenty-seventh Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:	
January, 1931, Preliminary Report on Economic Geology of the Shasta Quadrangle. Beryllium and Beryl. The New Tariff and Nonmetallic Products. Crystalline Talc. Decorative Effects in Concrete	.35
April, 1931, Stratigraphy of the Kreyenhagen Shale. Diatoms and Silicoflagellates of the Kreyenhagen Shale. Foraminifera of the Kreyenhagen Shale. Geology of Santa Cruz Island	.35
**July, 1931. (Yuba, San Bernardino.) Feldspar, Silica, Andalusite and Cyanite Deposits of California. Note on a Deposit of Andalusite in Mono County; its occurrence and chemical importance. Bill creating Trinity and Klamath River Fish and Game District and its effect upon mining	----
October, 1931. (Alpine.) Geology of the San Jacinto Quadrangle south of San Gorgonio Pass, California. Notes on Mining Activities in Inyo and Mono Counties in July, 1931	.30
Chapters of Twenty-eighth Report of the State Mineralogist, 'Mining in California,' Walter W. Bradley. Published quarterly:	
January, 1932, Economic Mineral Deposits of the San Jacinto Quadrangle. Geology and Physical Properties of Building Stone from Carmel Valley. Contributions to the Study of Sediments. Sediments of Monterey Bay. Sanbornite	.35
April, 1932. Elementary Placer Mining Methods and Gold Saving Devices. The Pan, Rocker and Sluice Box. Prospecting for Vein Deposits. Bibliography of Placer Mining	.35
Abstract from April quarterly: Elementary Placer Mining Methods and Gold Saving Devices. Types of Deposits, Simple Equipment. Special Machines. Dry Washing. Black Sand Treatment. Marketing of Products. Placer Mining Areas. Laws. Prospecting for Quartz Veins. Bibliography (mimeographed)	.25
July-October. (Ventura.) Report accompanying Geologic Map of Northern Sierra Nevada. Fossil Plants in Auriferous Gravels of the Sierra Nevada. Glacial and Associated Stream Deposits of the Sierra Nevada. Jurassic and Cretaceous Divisions in the Knoxville-Shasta Succession of California. Geology of a Part of the Panamint Range. Economic Report of a Part of the Panamint Range. Acquiring Mining Claims Through Tax Title. The Biennial Report of State Mineralogist	.65

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Chapters of Report XXIX, 1933 (quarterly: titled 'California Journal of Mines and Geology,' containing the following:

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Chapters of Report XXX, 1934 (quarterly): titled 'California Journal of Mines and Geology,' containing the following:

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Chapters of Report XXXI, 1935 (quarterly): titled 'California Journal of Mines and Geology,' containing the following:

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Chapters of Report XXXII, 1936 (quarterly): titled 'California Journal of Mines and Geology,' containing the following:

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April. Geology, Mining and Processing of Diatomite at Lompoc, Santa Barbara County. Essentials in Developing and Financing a Prospect into a Mine. Gold-bearing Veins of Meadow Lake District, Nevada County. Semi-Precious Gem Stone Collection in Division Museum .50

July. Mines and Mineral Resources of Calavaras County Mining in California by Power Shovel. Assessment Work on Mining Claims Within Withdrawn Areas. Joshua Tree National Monument. Cost

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Chapters of Report XXXIII, 1937 (quarterly): titled 'California Journal of Mines and Geology' containing the following:	
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Map No. 33	—Rincon, Ventura County	1.00
Map No. 34	—Mt. Poso, Kern County	.75
Map No. 35	—Round Mountain, Kern County	.75
Map No. 36	—Kettleman Hills, Fresno, Kings and Kern Counties	1.25
Map No. 37	—Montebello, Los Angeles County	1.00
Map No. 38	—Whittier, Los Angeles County	1.00
Map No. 39	—West Coyote, Los Angeles and Orange Counties	1.00
Map No. 40	—Elwood, Santa Barbara County	1.00
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Map No. 42	—Playa del Rey, Los Angeles County	1.25
Map No. 43	—Capitan, Santa Barbara County	.75
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Map No. 47	—Mountain View, Kern County	.75
Map No. 48	—Mountain View and Edison, Kern County	1.25
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Map No. 52	—El Segundo and Lawndale, Los Angeles County	1.00
Map No. 53	—Greeley and Ten Section, Kern County	.75.

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DETERMINATION OF MINERAL SAMPLES

Samples (limited to two at one time) of any mineral found in the State may be sent to the Division of Mines for identification, and the same will be classified free of charge. No samples will be determined if received from points outside the State. It must be understood that no assays, or quantitative determinations will be made. Samples should be in lump form if possible, and marked plainly with name of sender on outside of package, etc. No samples will be received unless delivery charges are prepaid. A letter should accompany sample, giving locality where mineral was found and the nature of the information desired.

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